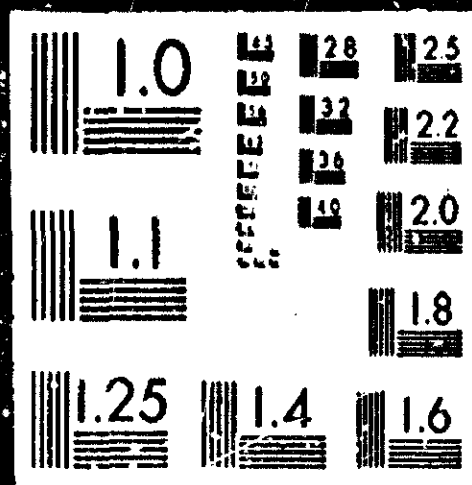


11 OF 11  
P.B 85  
917 0005

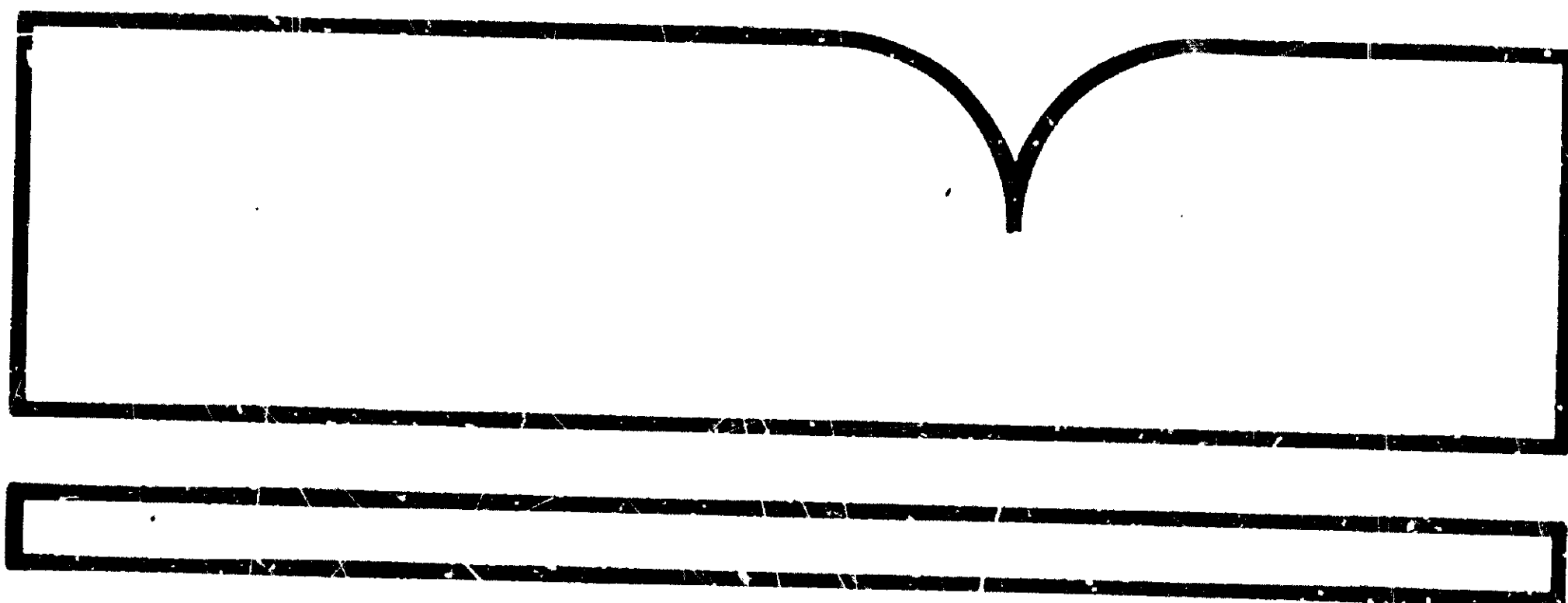


PB85-917005

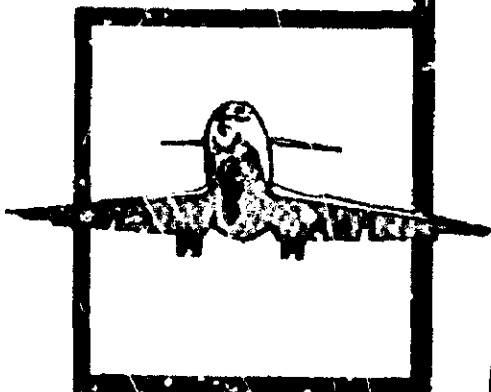
Special Investigation Report  
Railroad Yard Safety  
Hazardous Materials and Emergency Preparedness

(U.S.) National Transportation Safety Board  
Washington, DC

30 Apr 85



U.S. Department of Commerce  
National Technical Information Service  
**NTIS**



PB85-917005



# **NATIONAL TRANSPORTATION SAFETY BOARD**

WASHINGTON, D.C. 20594

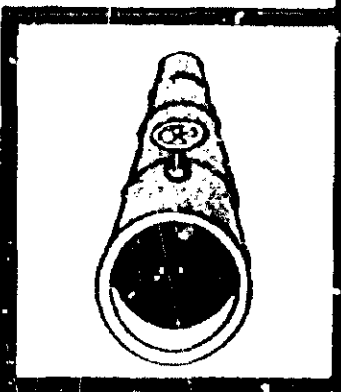
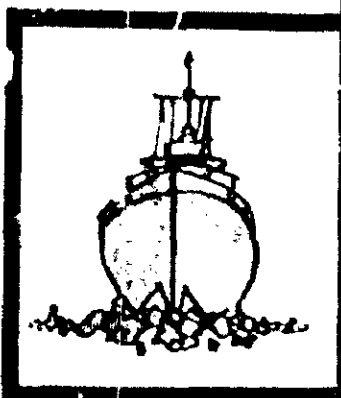
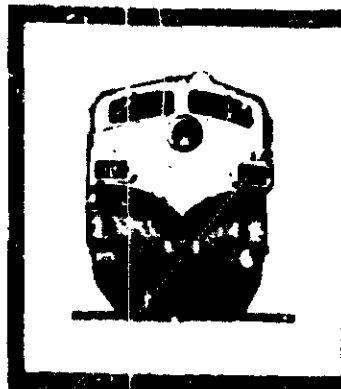
## **SPECIAL INVESTIGATION REPORT**

### **RAILROAD YARD SAFETY -- HAZARDOUS MATERIALS AND EMERGENCY PREPAREDNESS**

NTSB/SIR-85/02

**UNITED STATES GOVERNMENT**

REPRODUCED BY  
NATIONAL TECHNICAL  
INFORMATION SERVICE  
U.S. DEPARTMENT OF COMMERCE  
SPRINGFIELD, VA. 22161



# TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NTSB/SIR-85/02	2. Government Accession No. PB85-917005	3. Recipient's Catalog No.	
4. Title and Subtitle Railroad Yard Safety--Hazardous Materials and Emergency Preparedness	5. Report Date April 30, 1985		6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.		10. Work Unit No. 3722-B
9. Performing Organization Name and Address National Transportation Safety Board Bureau of Accident Investigation Washington, D. C. 20594	11. Contract or Grant No.		13. Type of Report and Period Covered Special Investigation Report April 30, 1985
12. Sponsoring Agency Name and Address  NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594	14. Sponsoring Agency Code		
15. Supplementary Notes			
16. Abstract Railroad yards, unlike mainline railroad operations, are similar to fixed-site chemical and industrial plants in terms of operating procedures, populations at risk, and emergency response preparedness capabilities. Like the fixed-site chemical and industrial plants, railroad yards are permanent facilities located within the boundaries of communities and close to schools, hospitals, businesses, apartments and housing complexes. To solicit comments and potential solutions to this problem from the railroad industry; involved communities; local emergency response organizations; and local, State, and Federal governments, on July 26 and 27, 1983, the Safety Board convened a public hearing in Arlington, Virginia. Twenty-three witnesses representing these entities were brought together to identify means for minimizing the potential for catastrophic releases of hazardous materials in railroad yards and to discuss the preparedness of communities and railroad yard operators for handling such emergencies. The hearing revealed that intricate parts of the problem were the hazardous materials classification system, the packaging safeguards required for tank cars used to transport various hazardous materials, the safety of operations within railroad yards, and their relationship to the ability of yard operators and adjacent communities to protect the safety and health of employees and the public during a hazardous materials emergency. Witness testimony revealed that these areas are so intertwined that safety deficiencies in one area can negate efforts to assure safety in one of the other areas. Clearly, any solution to the problems of hazardous materials releases in railroad yards must be derived through government, industry, and community cooperation.			
17. Key Words Railroad yard; hazardous materials; emergency preparedness; classification; training; shelf couplers; inspection; thermal protection; hazardous materials; emergency guidelines; research; tank cars; placards; shipping papers; emergency response.	18. Distribution Statement This document is available to the public through the National Technical Information Service Springfield, Virginia 22161		
19. Security Classification (of this report) UNCLASSIFIED	20. Security Classification (of this page) UNCLASSIFIED	21. No. of Pages 62	22. Price

This report discusses the potential for releases of hazardous materials in railroad yards, the preparedness of railroad yard operators and surrounding communities to deal with these releases, and the efforts being made by the Federal government to assist in railroad yard and community preparedness activities.

## CONTENTS

INTRODUCTION .....	1
SURVEY OF SELECTED U.S. CITIES .....	4
SURVEY FINDINGS .....	8
Hazardous Materials Movements .....	6
Planning Efforts (Host Communities) .....	9
Response Efforts (Yards) .....	10
Response Efforts (Host Communities) .....	11
Lessons Learned (Railroad Yards) .....	12
Lessons Learned (Host Communities) .....	12
Survey Summary .....	12
TESTIMONY AND WITNESS STATEMENTS .....	13
Emergency Planning and Response .....	13
FEDERAL AGENCIES AND THEIR RESPONSIBILITIES .....	21
Department of Transportation .....	21
Federal Emergency Management Agency .....	25
Environmental Protection Agency .....	28
SUMMARY .....	27
CONCLUSIONS .....	30
RECOMMENDATIONS .....	32
APPENDIXES .....	33
Appendix A--Selected Survey Findings .....	33
Appendix B--Public Sector Emergency Preparedness Survey Guide .....	35
Appendix C--Railroad Yard Emergency Preparedness Survey Guide .....	44
Appendix D--Cars Switched at Somerville - 1982 .....	52
Appendix E--Southern Railway System Railroad Yard Emergency Plan: Selected Excerpts. ....	55

**NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594**

**SPECIAL INVESTIGATION REPORT**

**Adopted: April 30, 1985**

---

**RAILROAD YARD SAFETY: 1/  
HAZARDOUS MATERIALS AND EMERGENCY PREPAREDNESS**

**INTRODUCTION**

On April 3, 1983, at 4:00 a.m., mountain standard time, a tank car (DOT 111A60A1W1) containing 14,000 gallons of fuming nitric acid was pushed into an empty box car during a switching operation in the Denver and Rio Grande Western North Yard in Denver, Colorado. The tank car was punctured, leaking acid formed a pool, and a toxic vapor cloud resulted. Over a period of 8 1/2 hours, 9,000 residents were evacuated from a 4-square-mile area, and 4 area hospitals treated 34 patients for minor injuries from exposure to either the acid or its vapor. The City of Denver incurred costs of about \$88,000 for overtime and damaged equipment. The carrier incurred reported costs of \$107,000 for cargo and equipment damage and \$188,000 for spill cleanup. The Denver North Yard is adjacent to two interstate highways and several manufacturing facilities, and is less than 2 miles from the central business district of Denver. Had this accident occurred during business hours or during the rush hour, Denver emergency services officials estimate that the degree of community disruption and the number of injuries would have been significantly higher. 2/

Table 1 lists some of the railroad yard accidents investigated by the Safety Board over the past decade; they have resulted in 10 deaths, 1,379 injuries, and \$48 million in property damage. The estimated property damage reflects accident-year dollars and does not include lost wages, business opportunities foregone, or response expenditures by public agencies, all of which would escalate these figures markedly.

1/ Railroad yard - For purposes of this special investigation, a railroad yard is defined as a location at which switching operations are performed involving the origination, termination, and interchange of freight cars and characterized by tracks arranged into subyards each of which has a somewhat more specific purpose such as receiving, classification, and departure yards.

2/ For more information read Railroad Accident Report--"Denver and Rio Grande Western Railroad Company Train Yard Accident Involving Punctured Tank Car, Nitric Acid Vapor Cloud, and Evacuation, Denver, Colorado, April 3, 1983" (NTSB/RAR-85/10).

Table 1.--Railroad Yard Accidents Investigated by the Safety Board.

<u>Location</u>	<u>Yard/ Carrier</u>	<u>Date</u>	<u>Fatalities</u>	<u>Injuries</u>	<u>Reported Damage (\$)**</u>
E. St Louis, Illinois	Gateway; Alton and Southern	Jan. 22, 1972	0	230	7,500,000
Decatur, Illinois	Norfolk and Western Yard	July 19, 1974	7	349	1,800,000
Wenatchee, Washington	Apple Yard; Burlington Northern	August, 1974	2	113	7,500,000
Houston, Texas	Englewood; Southern Pacific	Sept. 21, 1974	1	235	13,000,000
Somerville, Massachusetts	No. 8; Boston and Maine	April 3, 1980	0	418	140,000
Kansas City, Missouri	Kansas City; Terminal Railway	Jan. 18, 1981	0	0	1,535,000
Newark, New Jersey	Oak Island; Conrail	July 27, 1981	0	0	39,000
Denver, Colorado	North Yard; Denver and Rio Grande Western	April 3, 1983	0	34	341,000

\*\*Source: National Transportation Safety Board.

Apart from these major accidents, railroad yard operators regularly report less severe accidents to the National Response Center. During the 12-month period from June 1, 1983, to May 31, 1984, 370 accidents in railroad yards were reported -- an average of more than 1 a day. Included in these reports were 101 derailments involving 120 railroad tank cars. In addition to the derailments, hazardous materials were released from eight deteriorated tank cars and four defective tank car shells; eight collisions were recorded -- all within railroad yards.

While large-scale accidents occur in railroad yards infrequently, experience shows that they can result in extensive property damage, injuries, and disruption to the host community. Therefore, while the probability of major accidents occurring in railroad

yards is low, the risk to the public health and safety in any given incident is high. Unlike operators of other fixed-site facilities, however, railroad yard operators are not required by regulation to prepare emergency plans. For example, under the provisions of 10 CFR 50 and other Nuclear Regulatory Commission directives, nuclear powerplants must develop and rehearse emergency plans. Owners or operators of hazardous waste facilities are subject to the emergency planning requirements of 40 CFR 264 which extend to the facility being responsible for familiarizing local emergency response groups with the facility's layout, properties of the hazardous materials handled at the facility, and appropriate response procedures. Airport operators certified by the Federal Aviation Administration (FAA) are required by 14 CFR 139 to develop emergency plans for various accidents, including a hazardous materials release. Interstate natural gas compressor station operators are required by 49 CFR 192 to develop an emergency plan and provide it to community emergency responders, as well as to familiarize them with the plan.

Emergency plans have been developed voluntarily by many fixed-site hazardous materials facilities which describe clearly the capability, resources, and responsibilities of local emergency responders and incorporate them into an action plan. For example, the Louisiana Division of Dow Chemical Company developed a so-called DAISY procedure (Dispersion Analysis Information System) after concluding that, "As often as not, conflicting information, confusion, and uncoordinated response in connection with a release cause more corporate and even civilian problems than exposure to the release itself." <sup>3/</sup> Dow officials conducted "a thorough evaluation of area emergency response resources that included our own in-plant resources, area fire departments, State and city police, the parish (county) sheriff, and the area mutual aid group. It was found that most had adequate personnel and equipment, but they lacked coordination and specific information and plans to handle a plant situation which could affect surrounding areas." <sup>4/</sup>

Several Federally sponsored planning guidelines and other documents promote the need for contingency planning for hazardous materials accidents, but none identify railroad yards as a specific threat, even though other fixed-site facilities are specifically addressed. A planning guide and checklist published by the Federal Emergency Management Agency (FEMA) lists rail lines as potential risk areas, but does not include railroad yards among other specified, fixed-site facilities requiring special planning attention.

Transfer points (including railroad yards) have been recognized as areas presenting high risks to public safety in two projects financed in part by the DOT. <sup>5/ 6/</sup> However, neither approaches the subject on the basis that railroad yards and other transfer points characteristically are more similar to chemical plants than those main line railroad operations.

<sup>3/</sup> G. W. Dalgre, "Daisy Who? - Dow's Louisiana Emergency Response System," The Environmental Forum, Vol. 1, May 1982, p. 7.

<sup>4/</sup> Ibid. p. 8

<sup>5/</sup> "San Francisco Bay Area Hazardous Spill Prevention and Response Plan," Association of Bay Area Governments, Berkeley, California, DOT Contract No. DTRS-5681-C-00064, February 1983.

<sup>6/</sup> "Demonstration Project to Develop a Hazardous Materials Accident Prevention and Emergency Response Program," Emergency Management and Civil Defense Division, Consolidated City of Indianapolis, DOT Contract No. DTRS-8681-C-00082, August 1983.

Since the threat of a large-scale accident exists in railroad yards and since there are no requirements for emergency planning for these facilities, the Safety Board surveyed the current status of emergency preparedness at eight railroad yards located throughout the United States and following this survey conducted a 2-day public hearing to solicit additional views on several related topics.

### SURVEY OF SELECTED U.S. CITIES

The National Transportation Safety Board developed two survey guides (see appendixes A and B) designed to assess the overall preparedness of railroads and communities for a hazardous materials release into the community by examining three distinct subjects:

1. Preparedness within the community;
2. Preparedness within the railroad yard; and
3. Evidence of sustained preparedness coordination between the community and the railroad yard.

Preparedness was examined in the survey by focusing on four separate activities:

1. Mitigation--legal requirements, political efforts, corporate policies, or resource expenditures to decrease the probability or consequence of a hazardous materials release from a railroad yard into the community.
2. Planning--activities or resource expenditures to acquaint the community and the railroad yard with each other's--
  - a. perceptions of risk to the community;
  - b. response capabilities;
  - c. response needs, i.e., information, equipment, personnel, and;
  - d. expectations as to resources each entity could and should provide in an emergency or disaster.
3. Response--actual performance of emergency tasks, some of which are generic to all emergency and disaster events and others of which are unique to large-scale hazardous materials releases.
4. Lessons learned--changes in the first three activities which took place as a direct result of a large-scale accident and which were directed to decreasing public loss in the event of a similar occurrence.

The railroad yards selected, the date of visiting the site, and the respondent's titles are set out in figure 1. All but Atlanta and Alexandria had experienced railroad yard accidents involving large-scale public evacuations or injuries within the past 10 years. The interviews of railroad yard officials and public emergency response groups each averaged 3 hours and were conducted either by a Safety Board hazardous materials specialist or railroad specialist, and, most often, by both.

CITY	RAIL YARD	DATE	RESPONDENTS TITLES	
			RAILROAD	PUBLIC
Houston, Texas	Southern Pacific Railroad; Englewood Yard	05/24/83	Manager, Hazardous Materials; Chief Mechanical Officer; Manager, Dispatching Operations	Fire Department: Fire Chief and District Chief - Hazardous Materials
Alexandria, Virginia	Richmond, Fredericksburg and Potomac Railroad; Potomac Yard	05/18/83	Yard Superintendent	Fire Department Chief, Deputy Chief, Haz. Mat. Coordinator, City Emergency Preparedness Coordinator
Decatur, Illinois	Norfolk and Western Railroad	05/23/83	Division Superintendent	Fire Department: Fire Marshall, Inspector, County Emergency Services Coordinator
E. St. Louis, Illinois	Alton and Southern Railroad; Gateway Yard	05/25/83	Yard Superintendent, Trainmaster	Fire Department Chief (Also city Emergency Coordinator), Deputy Chief
Kansas City, Missouri	Kansas City Terminal Railway Co.	05/17/83	Railway Superintendent, Training Director	Fire Department: Training Director, Haz. Mat. Training Officer
Somerville, Massachusetts	Roston and Main Railroad Yard #8	06/01/83	Yard Superintendent, Security Superintendent, Safety Director	Chief, Fire Department
Denver, Colorado	Denver and Rio Grande Western Railroad, North Yard	05/27/83	Safety Superintendent	Assistant Chief, Fire Department
Atlanta, Georgia	Southern Railway System, Inman Yard	07/06/83	Terminals Superintendent, Corporate Director of Hazardous Materials and Safety	Fire Department: Deputy Chief, Deputy Chief Operations, Captain Fire Bureau, 2 Fire Bureau Commanders

Figure 1.—Railroad yard survey dates and respondents.

The findings of the survey are drawn from statements, documents, or other materials presented by respondents to the survey. The Safety Board does not assert that these locations constitute a random or stratified sample of the population of communities having railroad yards within their boundaries.

### SURVEY FINDINGS

Hazardous Materials Movements.--Table 2 presents estimates by railroad officials of hazardous materials movements through their yards on a daily basis. None of the officials could provide this information during the on-site interview in an aggregate, summary form except the Boston and Maine Yard officials in Somerville, Massachusetts. (See appendix C.) All others either estimated these data or provided it following a special effort to retrieve and consolidate hazardous materials data compiled for operating purposes. After one such effort, a yard safety director expressed that he was "amazed" at how many cars of hazardous materials moved through his yard and that he had been "curious about it" for some time.

Table 2.--Railroad Cars Switched In Surveyed Yards\*

<u>Location</u>	<u>Estimated Total Cars/Day</u>	<u>Approximate Haz Mat (percent)</u>	<u>Approximate Haz Mat Cars/Day</u>
Houston, Texas	3,500	15	525
Alexandria, Virginia	3,300	1	33
Decatur, Illinois	1,070	2	21
E. St. Louis, Illinois	3,600	10	360
Kansas City, Missouri	250**	3	8
Somerville, Massachusetts	350	1	4
Denver, Colorado	670	4	27
Atlanta, Georgia	1,980	5	99

- \* All respondents reported that these figures are less than previous years.  
 \*\* Number of cars switched by this operator; he estimates there are 12-15 thousand total run-through (non-switched) cars per day on adjacent tracks.

None of the responding railroad yards indicated that they had performed a vulnerability analysis to determine the quantity and types of hazardous materials most likely to be in the yard at any given time, i.e., the materials which could most likely be involved in an accident and pose the greater risk to the community.

All responding railroad yards reported regular inspections for hazardous materials compliance by the Federal Railroad Administration (FRA) and the Association of American Railroads (AAR), some of which were initiated at the request of railroad yard management. According to all respondents, insurance companies played no prescriptive role in regard to hazardous materials activities within the railroad yard.

The superintendent of the Norfolk and Western Yard in Decatur, Illinois, recently had requested that the City's emergency services director join him in establishing an evacuation plan for the area immediately surrounding the railroad yard. The Southern

Railway System directive requiring every yard in its system to establish an emergency plan was the only corporate-level policy statement of this kind found among the carrier representatives surveyed.

Except at Somerville, Massachusetts, none of the public officials reported the adoption of any code or ordinance specifically addressing the movement of hazardous materials within a railroad yard or its potential risk to their city. Ordinance No. 1980-10 of the City of Somerville requires that, "Prior to the rail transportation of any hazardous materials into or within the City, the operator of the rail carrier shall notify the Chief Engineer of the Somerville Fire Department twenty-four hours in advance of the content, amount, route, and destination point of any such shipment." Responding city officials stated that the volume of advance notifications proved burdensome, and therefore, the requirement was not enforced; however, information of the scope and in a format similar to appendix C is provided by Boston and Maine Railroad officials to the fire department administrator on at least a quarterly basis.

Other cities which receive hazardous materials information from railroad yards (quantity and type) do so through cooperative arrangements between the yard and public officials. Such arrangements were in effect in Decatur, Illinois, (Norfolk and Western yard superintendent and Decatur Emergency Services director), Denver (Union Pacific yard officials and Denver fire chief), and Houston (Southern Pacific Railroad and Houston fire chief). Illinois Gulf Central yard officials and the East St. Louis, Illinois, fire chief discussed a tentative meeting date for this purpose on the day of our survey. Several responding cities (Alexandria, Houston, Denver, Kansas City, and Atlanta) indicated that they desired to have greater knowledge of the quantities and types of hazardous materials moving through the railroad yards in their communities. Two cities, Alexandria and Decatur, reported that they had directed railroad yards in their communities to upgrade or increase the yards' firefighting water supply system.

Except for Southern Railway System, none of the carriers surveyed had established a corporate level policy on community-linked emergency planning for individual railroad yards. Perhaps as a consequence, the Atlanta railroad yard was the only yard which had at hand a written emergency plan prescribing tasks, procedures, and command responsibility for the management of a hazardous materials release affecting the community. All of the railroad yards surveyed had a listing of the telephone numbers of the local fire department, CHEMTREC, and a private spill contractor, and many provided the list in response to our inquiry regarding their "plan." The Decatur yard had several emergency action guides posted throughout the yard. Two railroad yard officials stated that they had provided training to local fire departments to familiarize firefighters with tank cars. Although valuable, this narrow training did not meet the Safety Board's definition of a railroad yard-specific, community-linked emergency plan.

Although the Norfolk and Western Railroad did not have a written emergency response plan specific to its Decatur railroad yard, city fire and emergency services officials reported that they often entered the yard to discuss its small-scale accidents which had been reported to State authorities. From these discussions, scenarios were developed and community preemergency plans were refined or developed in the event one of these accidents would escalate.

Industrial/public mutual aid organizations had been organized in Decatur and Houston in which railroad yard officials reportedly played an active role. Other than these examples, regular planning meetings, exercises, drills, or other contacts between railroad yard and city officials, for the purpose of a railroad yard-specific preemergency hazardous materials information exchange, were not reported by responding railroad yards.

While only one railroad yard had a written emergency plan to cover the range of resources, responsibilities, and risks specific to the yard and the host community, several responding railroad yards expressed concern about certain railroad yard hazards which they believed might pose a risk to the community. (See appendix A.)

The Southern Railway System requires all of its railroad yard managers to implement the procedures detailed in its Emergency Response Plan For Railroad Yards and notes in the introduction, "it is felt necessary an Emergency Response Plan be developed for each major yard to ensure:

- a. Adequate preplanning of actions to be taken;
- b. Availability of essential emergency response equipment; and
- c. Adequacy of firefighting capability (both private and public).

In view of the large numbers of cars constantly (sic) in transit through various railroad yards, this plan contains a series of guides for planned responses for various types of incidents that have a reasonable possibility of occurring" (emphasis added).

Southern's Emergency Response Plan for Railroad Yards contains seven sections:

- |             |   |
|-------------|---|
| Section I   | Emergency Response Guides - Fires   |
|             | <ul style="list-style-type: none"><li>a. Hazardous Material Car</li><li>b. Non-Hazardous Material Car</li><li>c. Fire Department Checklist</li></ul>  |
| Section II  | Emergency Response Guides - Spill/Leaking Cars  |
|             | <ul style="list-style-type: none"><li>a. Leaking Tank Car - Poison Gas/Flammable Gas or Flammable Liquid (Hazardous Materials)</li><li>b. Leaking Tank Car - Poison, Corrosive, Non-flammable Gas and Non-Hazardous Material</li><li>c. Leaking Boxcar, Trailers or Containers (Hazardous or Non-Hazardous Materials)</li></ul> |
| Section IV  | Yard Layout Sketch which includes entrance gates, location of available hydrants, and gas meters  |
| Section V   | Emergency Call Lists  |
| Section VI  | Fire Department - Recommendations for Handling Fires Involving Hazardous Materials  |
| Section VII | First Aid   |

In addition to being directed to provide local emergency responders a copy of the plan and a railroad yard map, Southern's employees are instructed on the information that is needed by public responders to improve incident management. (See appendixes D and E.)

Moreover, the plan requires in the event of an accident requiring outside assistance, that predesignated employees meet emergency responders at a designated gate, provide them with communication equipment, and escort them to a preselected area where fire trucks and equipment will have access to the damaged equipment. This plan's level of detail and attention to the needs of community responders were not found among other written instructions in the other railroad yards surveyed.

Responding railroad yards, in most cases, identified a need to improve overall preparedness for a hazardous materials accident impacting the community. (See appendix A.)

Planning Efforts (Host Communities).--All of the surveyed cities had a generic emergency plan which included a separate hazardous materials annex. Few of these annexes, however, contained railroad yard-specific information on risks, the cities' responsibilities within the railroad yard facility, or their relationship to city capabilities. The placement and quantity of yard water supplies were sometimes addressed, only because they were subject to fire department fire code inspections. There was no reference to the railroad yard in the East St. Louis, Illinois, emergency plan--the city fire department had never (in the memory of local railroad yard and fire service personnel) been inside of the Alton and Southern Gateway yard.

The majority of community officials stated a need to improve, in some cases initiate, planning efforts with railroad yard officials. This would logically follow from the perception of most public officials surveyed that the railroad yard was the No. 1 or 2 ranked low-probability/high-consequence hazardous materials threat to the community. Appendix A lists the relative risk the railroad yard presents to each community, according to the responding officials.

The City of Denver developed incident maps which focus on the three major railroad yards within the city (Burlington Northern, Union Pacific, and Denver and Rio Grande Western). Planning sessions had been conducted with railroad yard personnel of the Burlington Northern and Union Pacific Railroads. Other cities, such as Alexandria, have written standard operating procedures for a railroad yard accident which detailed the order of apparatus response, general information on the railroad yard layout, and precautionary guidance in the event the incident involved a tank car. Alexandria's standard operating procedure No. 8, as well as others, does not clearly define the types of information the railroad yard should supply the city upon notification, what to expect of railroad yard personnel upon arrival, <sup>77</sup> preemergency isolation or evacuation guidance, or other potentially useful information to address a large-scale release from the railroad yard.

None of the cities presented a preemergency planning document for a railroad yard in its jurisdiction which addressed notification of community officials, functional responsibilities, evacuation guidelines (i.e., notification of the public, evacuation, routes, assembly areas, public shelters, and special problem facilities), identified

<sup>77</sup> Alexandria's procedure No. 8 states, that upon arrival at the railroad yard perimeter, "There will usually be a railroad official available to direct the company to the location of the emergency."

supporting organizations, or included a map of the railroad yard facility. While almost all of this information could be found scattered throughout several emergency preparedness plans or emergency operating procedures, in no case was there a comprehensive document directed to an emergency in a railroad yard located in the community.

At the time of the survey, Atlanta was in the process of developing a plan for the Southern yard. Using Southern's Emergency Response Plan for Railroad Yards as a starting point, the city was beginning to develop notification, command and control, and response procedures with the railroad yard similar to those developed for the city's R. M. Clayton Water Pollution Control Plant and a fuel tank farm in the area. Each of these developed plans was a site-specific document which accounted for, among other things, population density and types of occupancy surrounding the facility.

None of the responding public officials believed that the current level of preparedness for a large-scale railroad yard accident matched the high hazard ranking they had ascribed to it relative to other hazardous materials threats within the city. (See appendix A.)

Response Efforts (Yards).--With some variations, responding railroad yards listed the following as basic response activities relating to a hazardous materials release occurring within the yard:

1. accident occurs;
2. control tower personnel notify mechanical department to visually assess damage;
3. if necessary, and if possible, damaged cars are isolated;
4. if outside assistance is necessary, call the fire department and the Chemical Transportation Emergency Center (CHEMTREC).

The number of activities between steps 2 and 4 varied among the railroad yards according to the availability of equipment and personnel, and emergency procedures that were required to respond to the accident. Most, but not all, of the railroad yards had some protective equipment (self-contained breathing apparatus, acid spill suits, etc.), neutralizing substances, foam, and containment materials (sand, booms, and absorbents).

The Atlanta and Houston yard operators each have large hazardous materials emergency response vans located near, but not in, these yards which could be called in the event of major chemical releases. The Denver yard has several acid suits and containment equipment aboard a work train which is kept at the railroad yard when not in use at a main line accident site. The other responding railroad yards had less emergency response equipment.

All of the railroad yards listed the name of at least one private hazardous materials response company to be called upon if additional equipment was needed. None of the yards had any full-time fire suppression personnel; they all stated that this task would be the responsibility of the local fire department.

It was difficult to assess from the survey the scope and degree of hazardous materials expertise available within the railroad yards. Sources of hazardous materials training reported by the respondents were federal, State, and local governments, railroads, universities, professional associations, and private organizations. For the most part, mechanical department employees were reported to have the most training in this area.

The survey revealed a great variation among railroad yard operators in their perception of the emergency response tasks which would have to be performed by community officials once a decision had been made to notify public emergency response groups. Perceptions also varied on how the tasks should be performed, and the effort necessary to assure their performance. For example, Alton & Southern Gateway yard officials have never discussed these issues with community officials, and therefore had little or no understanding of the capabilities of community responders. At the other end of the spectrum was Southern Railroad's directive that railroad yard managers provide to the community's responders immediate hazardous materials identification, container condition, potential impact, and advice on evacuation. Requirements at other yards fell between these two extremes. The Boston and Maine Railroad's emergency procedures document specifies some community emergency response needs. Although not yard-specific, the procedures were implemented, "...to provide emergency service personnel (fire, rescue, and law enforcement) with improved information when responding to a hazardous commodity incident." The tasks required of railroad officials are: to provide correct chemical identification by document or telephonic spelling (and suggest that this be repeated); to suggest to responders that a command post be established; to report a yard spill immediately to railroad yard officials, no matter how slight; and to offer any assistance that community responders may request.

Response Efforts (Host Communities).--All of the communities surveyed reported they had equipment and/or conducted training to perform hazardous materials response tasks; however, the scope and definition of these tasks, as well as the available equipment, varied. For example, notifying the public of an evacuation is a task that was recognized as necessary by all the public officials surveyed. Most cities depend on a siren system (either city-wide or selected-area) reinforced by police delivering the message verbally or a street-by-street basis. Denver uses a selected-area siren system augmented by taped messages in several commercial and residential high-rises to alert occupants of fire emergencies. The Denver tape system is being improved so that messages regarding hazardous materials threats also will be possible.

Spill containment in most communities is performed by deploying "hazardous materials vans" containing a wide variety of protective clothing, patch kits, special tools, test equipment, and reference texts. The vans and designated hazardous materials personnel to accompany them were fire department resources in all communities except Decatur and Kansas City where these resources were assigned to other emergency service departments. The Alexandria fire department has purchased a van and has received budget approval to equip it. East St. Louis currently depends upon State hazardous materials equipment, but plans to purchase and equip a van. Thus, all communities exhibited a desire or commitment to use dedicated equipment to perform hazardous materials containment tasks.

One task commonly identified by public respondents as critical to managing hazardous materials incidents is the prediction or monitoring of the path of a toxic or flammable cloud into the community. Various reported means to accomplish this included portable weather stations, automated dispersion models available from government or private sources, hand calculator models, and wind socks attached to command vehicles. Only the East St. Louis fire department reported that the yard "probably" would supply this information. Only the Southern Railway's yard plan directed its employees to determine and report wind direction to public emergency response personnel as part of the initial notification of the accident.

Lessons Learned (Railroad Yards).---Most railroad yard officials stated that experiences in previous incidents led to more care in switching operations, improvements in training and equipping railroad yard personnel, and a greater awareness of the risks posed by hazardous materials in accidents. In addition, several responding railroad yards reported an increased effort on their part to train community response personnel in rail safety procedures, tank car design, and materials identification and response techniques.

The Decatur yard superintendent increased his personal participation activity in the area's public/industrial mutual aid organization and took a unique approach to what he considered to be the public image problem of the yard as a result of the 1974 accident. Decatur emergency officials stated that the yard superintendent had initiated continuing planning activities between himself and the community in order to stimulate identification of risk and resource information exchanges. In addition, the yard has provided "open-house" tours of all yard facilities to the general public because the superintendent "did not want the yard to be a big secret" to the community. These efforts have resulted in company and community awards to the superintendent for safety and community interest achievements.

At the time of the survey, none of the other responding railroad yards reported changes in planning or response links between the yard and the community as a direct result of lessons learned from any of the large scale accidents listed in figure 1. The Denver and Rio Grand Western stated that it anticipated no change in the emergency ties with the community to result from the Easter Sunday incident because: the incident involved a very good response, there were no injuries, and the Denver Fire Department did a very good job. However, at the least, the transcript of Denver fire department tape of the railroad's notification of the accident indicates that the railroad yard notification procedures should be improved. The railroad official, in reporting this accident to the fire department, did not clearly identify himself or the yard, did not know the identity of the chemical, did not know that the car had been punctured, and did not know that the fire involved railroad ties--not a tank car.

Lessons Learned (Host Communities).---Responding public officials reported that there have been increases in training and equipment for hazardous materials incidents over the past 10 years; however, several could not determine whether the increases were a result of a previous railroad yard accident in their community or of nationwide attention to several large-scale accidents elsewhere in the United States.

Survey Summary.---Four basic findings or observations regarding railroad yard emergency preparedness were derived from the survey:

- o Railroad yards are fixed-site facilities not unlike chemical manufacturing or processing plants which receive raw chemical materials, process them, and ship the resulting chemical products. A railroad yard receives bulk chemical containers, "processes" them by rearranging their order according to destination (involving stress on the containers) and dispatches the containers, in the changed order.
- o No federal, state, or local requirements are in force currently for railroad yards to develop, implement, test, or maintain an emergency preparedness plan--either within the railroad yard or in conjunction with the host community. Requirements for such planning do exist for other types of hazardous materials fixed-site

facilities which exhibit similar low-probability/high-risk to the community (nuclear plants, certificated airports, and hazardous waste storage and treatment facilities, among others). In addition, there is evidence of extensive preparedness planning involving some chemical facilities and their host communities which were implemented without regulatory pressures.

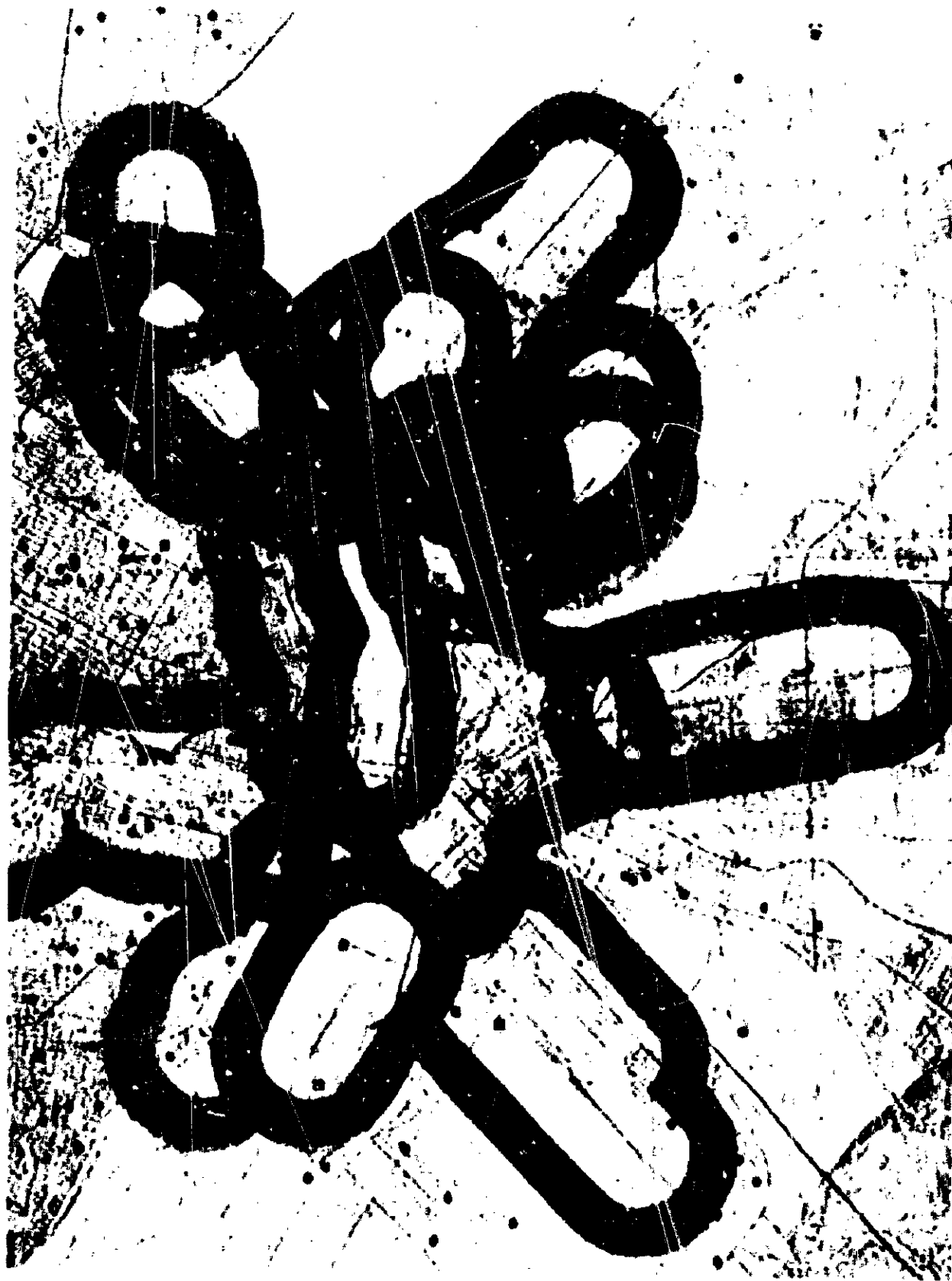
- o Emergency preparedness planning for fixed sites (including allocation and acquisition of response capability) can reduce uncertainty and loss to the community more efficiently than can emergency preparedness planning for random site transportation hazardous materials accidents.
- o Many large railroad yards are located in densely populated areas that have enveloped the yards in the course of urban and suburban growth. The removal of the railroad yards from populated areas is seldom a feasible solution and without land use restrictions being imposed to provide an undeveloped zone around relocated railroad yards, the risks posed are only deferred to a future time. Therefore, increased emergency response preparedness is the practical alternative to lessening the potential impact on the community of a hazardous material incident.

#### TESTIMONY AND WITNESS STATEMENTS

Emergency Planning and Response.--Following the survey, the Safety Board convened a public hearing in Arlington, Virginia, on July 26 and 27, 1983, to solicit comments from the railroad industry, involved communities, local emergency response organizations, and local, State, and Federal governments. Twenty-three witnesses representing various interested parties were brought together to testify regarding means for minimizing the potential for catastrophic releases of hazardous materials in railroad yards and their consequences and to discuss the preparedness of communities and railroad yard operators for handling such emergencies.

During opening testimony at the hearing, Safety Board staff presented maps of the localities surveyed which highlighted the potentially affected zones around the major railroad yard in the communities in the event of a hazardous materials release. Included within the affected zones were residential areas, schools, hospitals, shopping centers, major transportation facilities and arteries, central business districts, and manufacturing centers. Hazardous materials plume-dispersion models for selected chemicals also were presented which depicted the arrival time and effect of a release into the community. (See figures 2, 3, and 4.) The primary objective of these displays was to portray the relatively high population densities and congestion which typically surround a large urban railroad yard. Given the speed and potential impact of a major release occurring in one of these areas, improved emergency preparedness would provide increased public protection at less cost than other possible alternatives, i.e., alternate placement of existing facilities or rerouting of hazardous materials shipments.

The Mayor of Somerville, Massachusetts, testified and shared his concern about accidents involving the transportation of hazardous materials through railroad yards:



**Figure 2.--Evacuation zones developed for railroad yards at East St. Louis, Illinois, based on evacuation distances recommended in the Department of Transportation's 1984 Emergency Response Guidebook (DOT P-5800.3).**

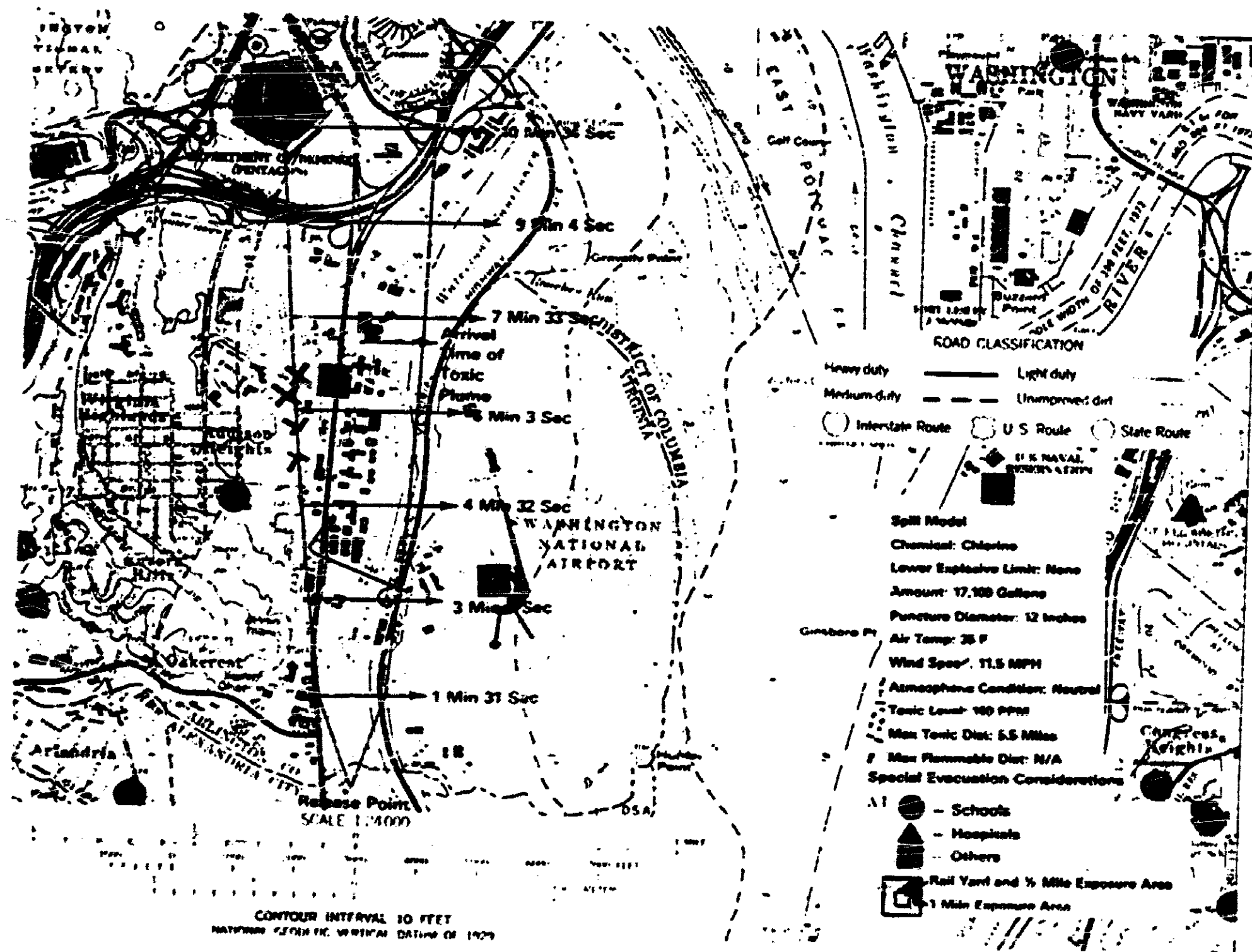


Figure 3.—Air Dispersion Release Model for Chlorine  
 Overlayed over Alexandria, Virginia, showing times of arrival  
 of toxic vapor cloud within commercial area. Source of Air  
 Dispersion Release model: U.S. Coast Guard  
 Hazardous Assessment Computer System (HACS).

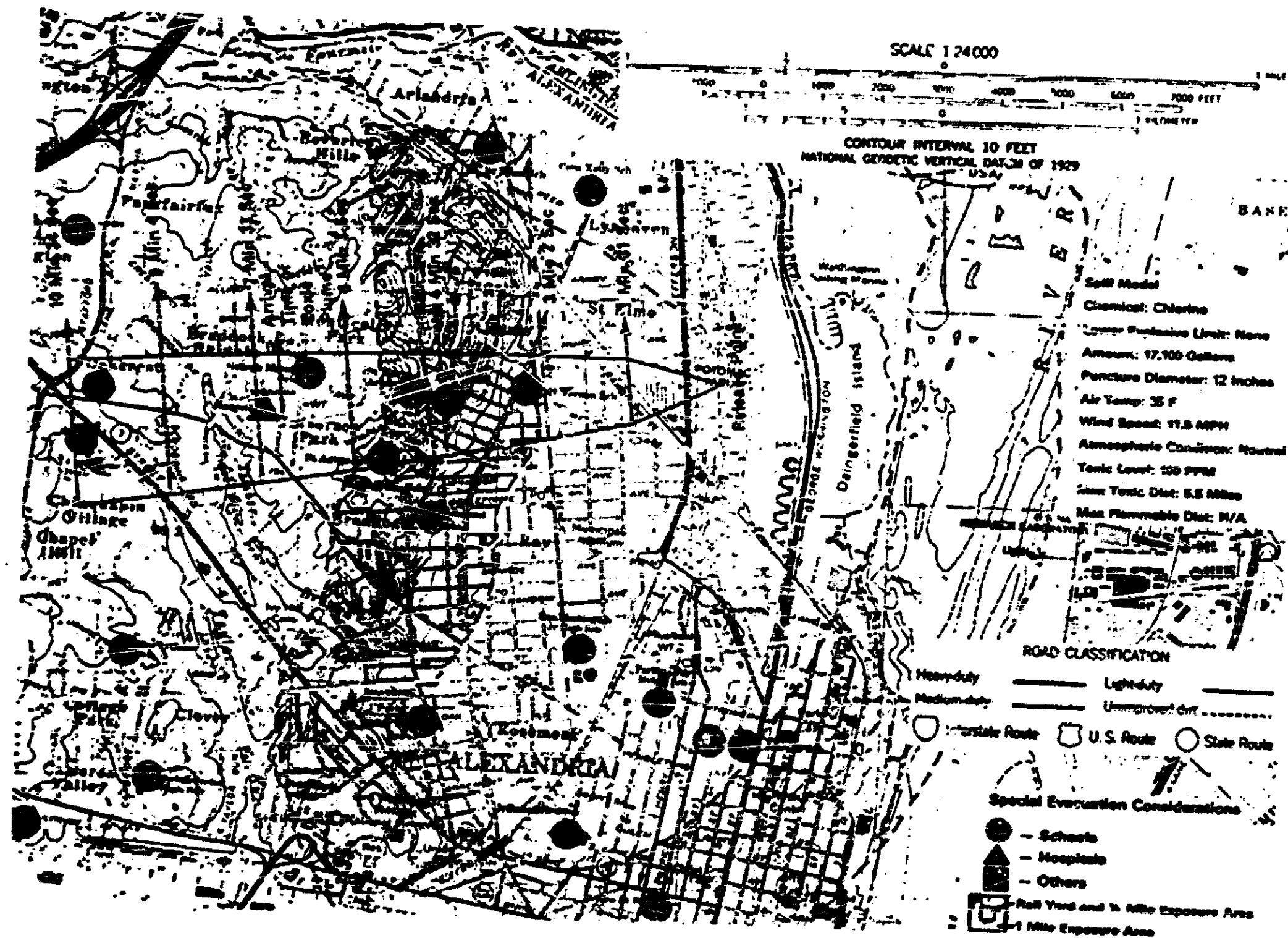


Figure 4.—Air Dispersion Release Model for Chlorine Overlayed on Alexandria, Virginia, showing time of arrival of toxic vapor cloud at schools and other unique occupancy buildings. Source of Air Dispersion Release Model: U.S. Coast Guard Hazardous Assessment Computer System (HACS).

On April 3, 1980, I saw fear in the eyes of my constituents. The uncertainty of families leaving their homes and not knowing when they would return. I saw business destroyed. I saw firemen and public safety officials risking their lives combating a foreign substance. These are lasting impressions, and what is also a lasting impression is the inadequacy of Federal and State policies to regulate the transportation of hazardous materials. . . . I saw what happened to my community, and I came here today to tell you that if we're going to have the 18,000. . . hazardous materials going through railyards throughout our Nation, then certainly it is the responsibility of your committee [the Safety Board], and the responsibility of all of the railroads, to protect its citizens.

The Mayor of Alexandria, Virginia, stated that his community is one of the most densely populated in the country, and referring to railroad yards, testified, "Probably if you were building your city starting from scratch you probably wouldn't put any of them where they are. . . ."

The Director of the Denver, Colorado, Office of Emergency Preparedness, stated that the Easter Sunday nitric acid spill, ". . . tested all of our capabilities to the fullest," and that ". . . the end of one incident is the start of planning for the next large scale incident, which we feel is inevitable." Commenting on the need for railroad yards to develop emergency plans, he continued ". . . that the railroads should be required to submit some type of a disaster plan to the city similar to what the Environmental Protection Agency (EPA) requires of industry. Procedures to be addressed in the plans would be proper notification in their prioritized way, identification of the material involved, the names of contact persons, and the availability of resources to mitigate the incident within the area."

The usefulness of pre-emergency planning between a railroad yard and its host community was described by the Director of the Disaster Research Center, University of Delaware. In comments submitted for the docket of the hearing, he wrote:

While it is extremely difficult to plan and to respond well to hazardous material emergencies along transportation routes, it is relatively easier to do so for fixed sites. The reason is simply because some of the parameters of an emergency can be estimated or projected ahead of time. Such factors as potential risks, vulnerabilities, available resources, etc., can be more readily factored into planning in a way that is almost impossible for random sites along transportation lines.

A witness from the Southern Railway Company explained that the development of yard-specific emergency plans throughout the railway's system had its origin in his experience as a nuclear attack planner. Southern's Director of Hazardous Materials and Safety stated:

Going through the development of that [nuclear] plan and seeing the difficulty in trying to save the civilian population of Washington, D.C., if a nuclear attack occurred really impressed me with what you can learn by doing a plan. It's just like teaching a course. To teach or plan, it brings you through every step. You have to visualize and recognize what the problems are most probably going to be in an actual response

situation. And in all my years I've been in emergency response with hazardous materials, I've always thanked God that we had some preconceived plan of action, some knowledge of what could we do if; and believe me, if you don't do it [plan for emergencies] you shouldn't be in the business of transporting hazardous materials. (emphasis added).

The need for more accurate information on the quantities and types of hazardous materials moving through the community's railroad yards was expressed repeatedly by community officials, both in the survey and at the public hearings. Several witnesses expressed concern that information in advance of a specific rail shipment through the community (commonly denoted as pre-notification) would be a costly, unwieldy, and probably fruitless endeavor. Witnesses representing public emergency response groups and the railroad industry agreed that periodic, summary information on hazardous materials yard traffic would be useful for emergency planning. Asked whether providing this information is important enough to be imposed legislatively, a Denver public official responded, "We feel that it is. We could reason that we could compile a list of our so-called dirty dozen of particular hazardous materials that go through the railroad yards in greatest quantities, and concentrate our training on the particularly hazardous materials." Responding to a similar question, the Mayor of Somerville stated, "We cannot be prepared for an emergency if we do not know what we're up against."

Supporting the need for more complete information on hazardous materials moving through railroad yards, the Associate Director of the Federal Emergency Management Agency (FEMA) stated, "A necessary element in the community development of a response plan is the identification of the many hazards. We encourage local officials charged with hazard mitigation and response to become familiar with the type and kind of hazards that are routinely stored [in] and travel through their communities." He continued by stating that it is an "absolute . . . for communities to first assess the hazards that can be confronted by the population."

As previously mentioned, a Somerville City Ordinance requires prenotification of the hazardous materials to enter the railroad yard; however, city officials have determined that sufficient information can be obtained for their emergency response planning purposes by the railroad yard providing a list of transiting hazardous materials on a periodic basis. The Manager of Safety for the Boston and Maine Corporation who supplies this information to Somerville testified:

In most cases, I am requested to provide those communities with statistics indicating the number of hazardous cars that are transported through their area. While this information can be considered historical rather than timely, it does offer a resource, in that a traffic pattern does emerge and the emergency responders are aware of the variety of hazardous materials transported through their towns by rail and can take advantage of that information when conducting their own training classes.

Commenting on the quantity and types of hazardous materials moving through the Potomac Yard in Alexandria, Virginia, the yard superintendent stated:

During the past 12 months a daily average of 2,871 cars have moved into and out of Potomac Yard. Of this total, an average of 30 cars per day, or approximately one percent, contain commodities that have been

designated as hazardous materials. Of this relatively small number of hazardous material loads, 80 percent are in low risk categories, such as corrosives, and only 20 percent are a commodity such as flammable gas or explosives (emphasis added).

Since it was a corrosive (nitric acid) that initiated the Denver incident and other incidents with which the Safety Board is acquainted, there may be some difference in opinion between railroad yard personnel and community emergency responders on what constitutes a hazardous material threat to the public.

Witnesses also expressed concern over the promptness of the railroad yard's notification of community emergency responders that an accident had occurred. Stating her dissatisfaction with the lack of notification in a recent railroad yard incident, a Newport News, Virginia, Councilwoman, representing the National League of Cities, testified, "You can have the best haz mat team in the world and it doesn't do any good if we don't know when accidents occur." Recounting the incident, she continued, "...the frightening part of the story is that we weren't notified [of the derailment of tank cars containing flammable gases. . .]" and "It seems to me if there is a derailment of a tank car we ought to be notified immediately." The Mayor of Somerville echoed this by stating, "We should be told immediately if there is any type of an accident. There is no reason why our fire department can't be there, even on standby."

Witnesses representing two railroad yards testified that it is standard procedure to notify local emergency responders immediately in the event of an accident involving cars laden with hazardous materials--without regard to whether the product is leaking at that time.

There was no consensus at the hearing regarding the exact time that a railroad yard should notify public emergency responders of an incident; however, public officials from Somerville and Newport News were not satisfied that their cities had been given a clear understanding of railroad yard procedures in the event of an accident potentially affecting the community. Somerville's Mayor testified, "Well, who is to say what is going to be an emergency until after the fact, when it is too late." Stated somewhat more emphatically by the Newport News Councilwoman, "We don't know what the railroads' expertise is, or what their preparedness is because they won't share it, and that's scary," and "public safety is the responsibility of local government. It is one of our charges and it bothers us a great deal that we don't seem to be able to cooperate with the rail system."

An adequate level of community/railroad yard hazardous materials risk management implies that each entity: will have a clear idea of the risk to the community, will have knowledge of the emergency resources and procedures of the other, and will familiarize the other with their response capabilities and expectations of what is needed to reduce the risk. For all of this to occur, each entity must develop a response capability, tailor parts of it to the specific needs of the other entity, and practice these procedures to the extent possible to identify new needs or to improve upon existing practices. Doing these things only after an accident has occurred means that the opportunity to prevent loss already has been missed.

Based on the Safety Board's survey, none of the eight surveyed cities and only one of the railroad yards within these cities had developed a yard-specific emergency plan which details risks and resources, and assigns responsibilities for that facility. Many carriers have provided copies of their procedures to community response groups in addition to railroad car familiarization and other reference materials. There is no question that these materials could be useful in the event of a railroad-related hazardous materials release--either within a railroad yard or on a main line; however, among the documents submitted, there were no yard-specific emergency plans other than the one developed by Southern Railway.

A railroad yard plan, according to the testimony of Southern Railway's Director of Hazardous Materials and Safety, considers the following:

A major portion of the yard plan concerns the local communities' emergency response services. The plan specifies preliminary contact to be made and planning to be done with the local response groups. Emergency response personnel are to be taken on yard tours and familiarized with the actual yard layout, yard operations, access routes, railroad personnel and locations of the fire hydrants and necessary drains. The yard plan is customized for each individual yard.

The respective division superintendents and their staffs are responsible for the implementation of the plan for each yard, because each yard's circumstances differ and merit differing responses. The designated officers must be familiar with these plans and are responsible for the development of local information, such as the list of the emergency phone numbers, contractors, sources of equipment and locally available experts who can be called upon if needed in an emergency.

Each yard plan is comprised of locally adopted versions of the following information. One, an officer is in charge of notification and call lists consisting of the names and phone numbers of those in position of responsibility who need to be notified in an emergency.

Two, a series of emergency response guides containing information and specific instructions on notification and identification and handling of those materials most often encountered.

Three, a scale map of the yard depicting exact location and identification of the yard's tracks and structures, its access roads, its entrance gates, fire hydrants, utilities, and other pertinent data for assistance during the transportation emergency or incident. A duplicate copy of this map would go back to the local emergency response agencies for their training and to assure coordination and effective communication between railroad personnel and those agencies in the event of an emergency.

Number four, the information and recommendations be given to the local fire departments about the handling of fires involving hazardous materials.

Five, first-aid instructions for the treatment of minor injuries until the injured can be transported for professional medical treatment. . . The key to the effectiveness of the emergency response plans is that they facilitate the taking of timely and correct actions by the railroads and the local response agencies, and the coordination of these efforts.

The information that a community requires to respond quickly to a large-scale hazardous materials release from a yard was not clearly understood by most railroad yard officials involved in the survey and the public hearing. A comment during the course of the Board's survey by a yard official involved in the Denver nitric acid release from his facility may give an insight as to why this situation prevails. He stated that no changes to emergency procedures would be necessary in the yard as a result of the accident because: (1) there were no injuries, and (2) the fire department did a good job in responding. Keeping in mind that in the various federal regulations which define a reportable hazardous materials incident, a yard accident escalates in scope when it results in a death or injury or results in damage equal to or greater than a specific dollar value. It is possible that a mind-set has formed such that when neither criterion is met, the accident is not considered to be serious. Further, when the fire department does a good job as it did in this case, the yard might presume to have provided to the community what it needed to mitigate the incident. This, of course, discounts the community's efforts toward performing well whether or not the yard has put forth any emergency planning effort before the accident. Of course, the best means to determine the adequacy of, and if necessary, improve the elements of an emergency response, is to conduct a multi-agency postaccident critique of the emergency response and to adjust future responsibilities and expectations accordingly.

#### FEDERAL AGENCIES AND THEIR RESPONSIBILITIES

Four Federal agencies have Congressionally mandated responsibilities concerning the safe transportation of hazardous materials by railroads and become involved to varying degrees whenever a catastrophic railroad accident occurs involving the release of hazardous materials at railroad yards or at other locations. These agencies and their responsibilities as they relate to preparedness for hazardous material emergencies at railroad yards are discussed below.

Department of Transportation.--The Hazardous Materials Transportation Act of 1974 (HMTA), as amended, vests in the DOT the following major safety authority and responsibility:

- o To establish the particular quantity and form of material in commerce that may pose an unreasonable risk to health and safety or property;
- o To assess civil penalties for regulatory violations;
- o To coordinate hazardous materials routing regulations;
- o To suspend or restrict the transportation of materials found to pose an imminent hazard.

- o The duty to establish and maintain a central reporting system and data center to provide law enforcement and firefighting personnel with technical and other information and advice for meeting emergencies in connection with the transportation of hazardous materials.

In response to this authority, the Secretary, DOT, has designated the Research and Special Programs Administration (RSPA) as the lead agency within the DOT to provide for the safe transportation of hazardous materials, except in marine transportation where authority has been delegated to the U.S. Coast Guard. The Secretary delegated to RSPA the authority to:

- o Issue hazardous materials regulations;
- o Designate the quantity and form of materials that are to be subject to the hazardous materials regulations;
- o Prescribe safety standards for the containers (such as tank cars) that are used to be to transport the various classes of hazardous materials;
- o Prescribe labels for containers and placards for vehicles to be used to transport the various classes of hazardous materials;
- o Prescribe handling, stowing, and other in-transit requirements for the various classes of hazardous materials;
- o Prescribe labels for containers and placards for vehicles used to transport the various classes of hazardous materials; and
- o Prescribe handling, stowing, and other in-transit requirements for the various classes of hazardous materials.

A Safety Board witness testified during the public hearing that:

Railroad yards are permanently located, identifiable facilities within the boundaries of many populated areas, and therefore exhibit many certainties in terms of personnel availability, operating procedures, and the population at risk. These constant features of a railroad yard distinguish it from the main-line rail accident environment. They could also be used effectively to preplan the emergency response to an accident which might occur at that yard.

Several other witnesses at the hearing, as well as comments submitted for the docket, supported the notion that railroad yards are being treated in guidance materials and training programs in a fashion which does not clearly identify them either as fixed-site facilities or as transportation facilities--probably the truth lies somewhere between the two for planning and response purposes; however, the preponderance of opinion would clearly place railroad yards on the fixed-site side of a continuum.

A pertinent article on this subject published in 1979 notes:

Many aspects of preplanning are discussed in training and during drills in the fire service. One area that has not been touched upon is railroad switch-yards, large or small, that dot our nation's rail system.

Continuing, the author states:

Preplanning of yards and terminals can be accomplished only by meeting with the railroad terminal officials and developing an adequate emergency plan. . . Because of the unique considerations at a railroad yard, planning is vital. It should include local input and involvement by appropriate yard officials so that all areas are covered. Proper planning will assure a coordinated effort carried out in a cooperative, efficient manner should an incident occur. 8/

record: An instructor at the Maryland Fire and Rescue Institute commented for the

The railyard is a special case in pre-incident planning. It combines the hazards associated with both fixed facility and transportation emergencies in a uniquely dangerous manner.

The physical layout of a facility can be accurately mapped, as well as the protective equipment that is available. The means of entry into the yard and the location of those in authority can also be determined well in advance of trouble. It is normal to project the placement of emergency apparatus and other tactical considerations onto an anticipated scenario at these locations. At this point, however, the methods used to preplan other facilities fall short in providing information necessary to make reasonable decisions about railyard emergencies.

Dealing with the probability of these complex patterns of switchbacks and colinear designs is of concern to any rational individual.

The daily movement of rail cars throughout a yard can change the routes of access to any one location. Cars on tracks which might be readily accessible at one time can quickly become hidden within a complex labyrinth of moving steel and product at any time.

Although the RSPA was made responsible for the issuance of all hazardous materials regulations and exemptions (except for transport by water), the initiative for developing and enforcing regulations applicable to a single mode was left within the respective modal administration. For instance, the development of tank car safety regulations is the responsibility of the FRA.

8/ Gene P. Carlson, "Hazardous Cargoes Make Rail Yards Prime Objects for Emergency Plans," Fire Engineering, Fire Protection Publications, Stillwater, Oklahoma, 1979.

The Administrator, RSPA, stated during the Safety Board's hearing that:

...the primary objective of the DOT's hazardous materials regulations is to effect a reduction in the number and severity of transportation accidents involving hazardous materials spills. . . . All packaging or container decisions are based on the classification of materials in accordance with the criteria set forth in the regulations. . . . The criteria embodied in the class definitions emphasize the damage of acute (short-term) accidental exposure, as opposed to chronic (long-term) effects on people and the environment. The Environmental Protection Agency (EPA) has been legislatively designated to regulate materials such as hazardous wastes and substances that pose primarily chronic threats to the public safety or environment. EPA's authorizing legislation overlaps significantly with provisions of the Hazardous Materials Transportation Act, which we administer. As a consequence, we and the EPA have worked closely together to assure that transporters not be confronted with two sets of conflicting regulations. In general, we have deferred to the EPA's expertise in assessing the nature of chronic health hazards, and have accepted EPA's designations of hazardous wastes and hazardous substances, and have identified them as hazardous materials in our regulations, whether or not they fall within one of the existing DOT classes for acute hazards. In our future rulemaking involving such materials, we will continue to rely on EPA as lead agency in designating additional materials defining long-term hazards, and in the qualification of the environmental benefits to be derived from Federal regulation of such material.

The Administrator stated that the agreements with the EPA concerning the identification of chronic hazards of materials were developed during the past 3 or 4 years, many years after the DOT had established its policy to consider only the acute hazards posed to public safety and health by materials in transportation.

Concerning the responsibility for providing technical information and advice to law enforcement and firefighting agencies for handling transportation-related emergencies, the Administrator of RSPA stated that this is a proper role for the Federal government and one that is critical to the successful emergency response. Further, he stated, "The Federal Emergency Management Agency (FEMA) is charged with providing a single focal point for all Federal emergency preparedness, mitigation, and response activities. FEMA, accordingly, claims the primary Federal role in assisting local jurisdictions in responding to hazardous material accidents. The DOT endeavors to augment FEMA's efforts by providing expertise and technical information gained through its regulatory program, which is impossible to develop at a State or local level." Programs operated by the DOT that support State and local hazardous materials emergency efforts are the emergency hotline within the Coast Guard National Response Center, the preparation and distribution of an emergency response guidebook, and the development of community planning guides through the sponsorship of a series of emergency response demonstration projects.

The Federal Railroad Administration, also an agency of the DOT, has responsibility for initiating and developing hazardous materials regulations applicable solely to railroad operations. The development of hazardous materials regulations for the

rail mode includes all necessary testing and research as well as cost/benefit analyses as appropriate. Draft regulations developed by the FRA are forwarded to RSPA for promulgation under the regulatory rulemaking authority provided by the HMTA. Additionally, the FRA has the responsibility to monitor and enforce the regulations that apply to the railroad mode.

The FRA's Office of Safety is responsible for the administration and enforcement of hazardous materials laws, rules, regulations, orders, and standards as they pertain to rail transportation safety. There are basically three types of inspections that FRA regional hazardous materials safety inspectors undertake: operations, equipment, and shipper and consignee. Operations inspections may include the inspection of shipping papers, placarding of shipments, notices to traincrews of hazardous materials in trains, and placement of hazardous materials in a train. Equipment inspections are completed randomly to determine the condition of the rail equipment used for the transportation of hazardous materials. Random shipper inspection is also used to determine whether hazardous materials containers are in proper condition for transportation by rail. Consignee inspection includes any other inspection activity undertaken by the FRA which does not fall into the operations, equipment, or shipper categories.

Federal Emergency Management Agency.---The Federal Emergency Management Agency's (FEMA) responsibilities were outlined in testimony presented at the Safety Board's hearing by one of its Associate Directors:

- o First, under Executive Order 12148 dated July 20, 1979, entitled "Federal Emergency Management," FEMA is charged by the President to coordinate and set national policy on all Federal activities relating to emergency and disaster preparedness, mitigation, response and recovery.
- o Second, FEMA is to be the Federal focal point to coordinate national emergency activities, across the full spectrum of disasters, with State and local government.

The Executive Order defines "civil emergencies" to include hazardous materials accidents. However, FEMA's major emphasis has been directed to plans and preparedness associated with radioactive materials. FEMA includes railroad yard activities as one of several hazards to be considered and the risk evaluated by emergency planners involved in developing response plans for hazardous materials accidents. The agency's program in hazardous materials has emphasized planning and coordination primarily at the local level. FEMA's major focus has been devoted to identifying problems and bringing them to the attention of other agencies having direct responsibility. FEMA has issued two documents which may be used by emergency planners as a checklist and guide for hazardous materials emergency planning.

- o "Planning Guide and Checklist for Hazardous Materials Contingency Plans", FEMA-10, July 1981.
- o "Guidance for Developing State and Local Radiological Emergency Response Plans and Preparedness for Transportation Accidents", FEMA-5, March 1983.

FBMA has a National Emergency Training Center which assists State and local emergency response organizations directly involved in planning responses to hazardous materials accidents/incidents. The concept developed and taught at the Training Center is termed the "Integrated Emergency Management System" and is designed to allow a community to prepare systematically for and deal with a spectrum of potential catastrophic scenarios, such as fire, floods, severe weather conditions, man-caused disasters, and technological disasters. FBMA considers the release of hazardous materials in railroad yards as a situation addressed by the "Integrated Emergency Management System."

Specifically, FBMA provides training to State and local personnel in planning for and responding to disasters. The National Fire Academy (NFA) located at Emmitsburg, Maryland, offers a series of courses to enable fire, law enforcement, and other State and local personnel to become proficient in planning for and taking appropriate action in response to hazardous materials accidents. This training has been provided to over 5,000 persons through FBMA's regional field training program and to over 1,500 persons in resident programs at the NFA.

Environmental Protection Agency.--The Environmental Protection Agency's (EPA) responsibilities in the area of hazardous materials rest primarily in several Congressional Acts. "Superfund" legislation known officially as the Comprehensive Emergency Response, Compensation and Liability Act of 1980 (Public Law 96-510) (CERCLA), gives the EPA the authority to respond to releases of oil and hazardous substances in all environments adding land and air to authority previously conferred by Section 311 of the Clean Water Act to respond to releases in navigable waters. Further, other legislation, the Resource and Conservation and Recovery Act, Section 263, requires that transporters clean up any discharges of wastes for which they are responsible. In testimony presented at the Safety Board's hearing, the Director of the Emergency Response Division, Office of Emergency and Remedial Response, indicated that the CERCLA is the only statute that EPA administers for which the President has delegated EPA all authority under the statute. While the President has delegated the principle responsibility for the "Superfund" program to the EPA, Executive Order 12316 assigns responsibilities to 11 other Federal agencies.

One of EPA's major roles under the "Superfund" legislation is to identify reportable quantities of hazardous substances and notification requirements if a release occurs. On May 25, 1983, the EPA published in the Federal Register a notice of proposed rulemaking on hazardous substance releases. This rulemaking covered about 60 percent of 696 hazardous substances that were identified in the "Superfund" legislation. Additionally, the EPA issued on the same date an advanced notice of proposed rulemaking on the reportable quantities for other hazardous substances.

The "reportable quantities" is a notification trigger regarding releases of hazardous substances in the air and on water and land. The EPA, in testimony at the Safety Board's hearing, indicated that about 50 percent of the number of hazardous substance releases covered by the "Superfund" legislation are the result of transportation-related incidents. Under the "Superfund" legislation and the National Contingency Plan, the responsible party must report the release of a hazardous substance into land, air, or water to the National Response Center. This activates the National Response Team (composed of EPA or Coast Guard personnel) if the responsible party cannot handle or does not respond to the emergency itself. If the responsible party

responds to the emergency, the EPA then monitors the private sector's actions. This team's purpose is to insure coordinated activity among the Federal agencies which may respond to an emergency.

As an example of EPA's activities during a hazardous materials emergency, the EPA spokesman at the hearing related EPA's actions at the 43-car derailment in Livingston, Louisiana, on September 28, 1982. During this emergency, a network of communications among local, State, and Federal officials was provided to insure a coordinated emergency response action. The Louisiana State Police's Hazardous Materials Response Team undertook the responsibility of directing emergency actions necessary to stabilize the burning tank cars. The EPA through its Region VI on-scene coordinator provided an Environmental Response Team and together with the U.S. Coast Guard Strike Team measured air pollutants in the evacuation zone. Additionally, the Federal teams assisted the State by taking soil and surface water samples, and supplied analytical support in the development of the Site Safety Plan. After the emergency situation was stabilized, the EPA continued to monitor the cleanup response.

The EPA's training curriculum currently offers 65 courses in various subjects dealing with hazardous materials. Its primary purpose is to train EPA's emergency response personnel; however, the courses are available to other Federal, State, and local government agencies as space permits. One type of training typically available is hazardous materials incident simulation. The course is designed to demonstrate the need for and measures to be taken to promote cooperation among the members of the environmental response teams. In at least one accident, a response team had what amounted to a dress rehearsal before actually having to react to a real-life emergency. On April 7, 1982, a derailment was simulated in Adams County, Colorado. Almost a year to the date, the April 3, 1983, accident at Denver, Colorado, occurred at about the same time and place involving a similar hazardous substance as practiced for in the simulation.

The EPA has for the past 2 years had an interagency agreement with the DOT regarding cooperation between the two agencies so that hazardous materials (particularly hazardous wastes) regulations adopted by the agencies are consistent. Accomplishments cited as a result of this agreement were the use by EPA of the DOT's hazardous materials regulations for controlling shipment of hazardous wastes, including the labeling, marking, packaging, placarding, and discharge reporting; the expansion of the DOT classification system to include hazardous wastes and additional hazardous substances; and procedures for coordinating future rulemaking activities. In addition to this formal cooperation, the EPA also provides DOT information gained from its involvement in releases of hazardous materials to transfer technology about hazardous materials, and makes recommendations concerning areas where the adequacy of the DOT classification system may warrant review.

### SUMMARY

The Safety Board concludes that railroad yards have not been recognized to be fixed-site low probability, high risk threats to the public health and safety by those responsible for promoting hazardous materials planning, for preparing response materials, and for conducting the response. In none of the areas studied during this special investigation could the Safety Board find any wide distribution of materials addressing emergency response or providing planning guidance which depicted the railroad yard as an

entity deserving of special attention for this purpose. The Safety Board concurs in the testimony at the hearing by the FEMA representative that "... the situation would be worthy of increased attention and activity by this agency," and believes that the point is applicable to other agencies as well. The Safety Board also concurs in the statement made by the FEMA official at the hearing that an emergency plan, based upon a solid and realistic assessment of risk, is an essential starting point to providing at least a minimal degree of coordination during a community emergency. An important aspect of such an assessment is the correlation of the level of preparedness with the density and type of the population which potentially would be exposed to the harmful effects of hazardous materials releases from railroad. For example, a community with an extremely high population density including many unique population exposures near a railroad yard would necessarily require extensive resources and a high degree of planning and frequent coordinated drills involving both the railroad yard operator and the community to effect acceptable emergency preparedness. Conversely, a sparsely populated community with no unique population exposures near a railroad yard could provide a reasonable level of public safety with fewer resources, provided there was a high degree of preparedness coordination between the two entities.

The Safety Board is encouraged by the activities made known to it since its survey and public hearing. For example, City of Denver officials recently informed the Safety Board that their relationship with all of the operators of railroad yards within their jurisdiction had "Improved 100 percent." Houston city and railroad officials jointly unveiled a comprehensive railroad yard emergency response plan. Additionally, the City of Atlanta very recently approved a railroad yard pre-emergency plan which was developed cooperatively with the Southern Railway and which closely resembles the level of detail found in the city's other site-specific emergency plans. On June 1, 1984, the Chessie System Railroad, issued its "Yard Hazardous Materials Incident Response Manual" to assist its employees in "the proper handling of hazardous materials incidents in the yard or terminal." Included within this manual are flow charts providing step-by-step instructions for emergency actions to be taken based on the DOT hazard classification of materials. Also, early in 1985, the Missouri Pacific Railroad Company established a policy requiring the development of emergency response plans for each of its railroad yards. It now is developing a general plan from which individual plans will be developed specific to the needs of individual railroad yards. Further, the Southern Railway has expanded its corporate requirement for railroad yard emergency plans to its smaller railroad yards, its sidings, and its switching facilities. Finally, both the Southern Railway and the Chessie System Railroads report that since the Board's July 1983 public hearing, numerous requests have been made by other railroad operators for copies of its railroad yard emergency manuals. Alone, the Chessie System Railroads have sent to short line railroads, individual railroad yard operators, and other major railroads over 300 copies of its manual.

These efforts represent only those which were brought to the attention of the Safety Board--no followup survey was performed at any of the communities or railroad yards surveyed. The Safety Board hopes that other communities and railroads will undertake, if they have not already, similar efforts to improve the level of preparedness by enhancing the coordination between the community and the operators of the railroad yards within it.

Apart from these community-based efforts, FEMA completed on May 16, 1984, a review of its own and other Federal agency's activities concerning hazardous materials emergency preparedness.

In a report based upon the review, FEMA concluded, among other things that:

No program office exists within FEMA to coordinate interagency hazardous materials activities; therefore, this function has gone largely undeveloped.

No national curriculum for hazardous materials training exists.

Duplication, overlap, and lack of coordination exists among Federal agencies involved in hazardous materials training.

Absence of a recognized and responsible policy maker and program officer for hazardous materials within FEMA results in erratic performance of hazardous materials functions within State and local governments.

FEMA's 1984 review contained an analysis of two previous efforts, one in 1979 and the other in 1981, to define FEMA's role relative to hazardous materials emergencies. Both previous efforts generated recommendations for adopting policies and programs within that Agency; however, action was never taken to implement the recommendations.

The recommendations of the 1984 review, which have been approved by FEMA's Director, are:

Create within FEMA a hazardous materials program office.

Develop and conduct in 1984 a national conference on hazardous materials emergency management. (This was postponed reportedly due to a lack of funds, but it was conducted in April 1985.)

Create and chair an interagency committee to coordinate Federal hazardous materials activities.

Negotiate memoranda of understanding with other Federal agencies to ensure accomplishment of the coordination aspects of Executive Order 12148.

Develop and present a new course on Preparing Emergency Management Personnel to Deal with Hazardous Materials Accidents.

Only one these recommended actions has taken place: the Safety Board encourages FEMA's early implementation of the yet unfulfilled recommended actions.

Much more needs to be done to enhance the capability of emergency response groups to perform the various duties either assigned to or expected of them during a railroad yard hazardous materials release. The types of hazardous materials training of which these groups can avail themselves currently is a topic receiving much attention. The U.S. DOT has ended its efforts as a resident trainer of the responders to a hazardous materials transportation accident while FEMA has been assigned a role by Executive Order and law, in providing training to emergency responders. In general, FEMA has been slow to fill the gap created by the DOT abandonment of its still mandated responsibility.

The Safety Board believes that FEMA could be the appropriate Federal agency to assign the overall training task; however, it is not convinced that the total abandonment of this function to FEMA by the DOT will result in effectively using the expertise of each agency to address adequately the railroad yard and many other transportation situations. For example, field inspection and accident data collection is essential to improving railroad yard emergency preparedness guidance. Since the DOT has a field staff and data collection system to tally the incidence of hazardous materials transportation accidents, the Safety Board must assume that DOT is better prepared than FEMA to assess and evaluate on a continuing basis certain characteristics of railroad yard incidents and accidents--FEMA has no field staff or data collection mandate for this purpose. The Safety Board finds that these two agencies have not established the formal, ongoing, and forward-looking relationship that is necessary to improving the guidelines now available for railroad yard hazardous materials emergency planning. If FEMA is to become this Nation's coordinator of training needs for the nation's emergency responders, then FEMA and the DOT must establish a formal and permanent link to exchange between them the necessary information and expertise that they each gather in the course of their separate mandates. Only this will ensure that the information which the DOT derives from its field activities and data collection relating to railroad yard emergencies will be shared with FEMA for incorporation into its training and manuals. Concurrently, only when the information which FEMA gains through its training forums is passed to the DOT to be incorporated into its regulatory and enforcement processes, can the multi-agency role in this process be expected to achieve improved results.

The Safety Board believes that a relationship must be formed among all agencies which have technical and regulatory responsibilities for the safe movement of hazardous materials through railroad yards--both in normal and emergency periods. The Safety Board often has stated, as part of its accident investigations and safety studies of hazardous materials incidents, that various agencies and organizations must cooperate fully to reduce the threat of future occurrences. The same is true regarding the urban railroad yard which generally has not received appropriate attention from planners within the highest levels of the Federal government and the railroad industry.

### CONCLUSIONS

1. While large scale accidents occur infrequently, historical experience in railroad yard accidents shows that they can cause large amounts of property damage, injuries, and social disruption.
2. Many large railroad yards are located in densely populated areas that have enveloped the yards through urban and suburban growth.
3. Railroad yards were cited as the number 1 or number 2 ranked large scale hazardous materials threat to the community by seven of the eight communities surveyed by the Safety Board.
4. As of the date of the Safety Board study, there were few preemergency plans which considered unique population exposures adjacent to railroad yards.
5. As of the date of the Safety Board study, there were no preemergency plans which were periodically exercised to identify and correct deficiencies in procedures.

6. Accidents frequently occur within railroad yards and often involve damage to railroad cars that may contain a wide variety of hazardous materials.
7. Toxic and/or flammable concentrations of chemicals can impact population exposures surrounding a railroad yard within minutes of the initial release.
8. Railroad yards are fixed-site facilities which have many constant conditions that can be addressed by preemergency planning, and for that reason qualitatively present a different problem than random site transportation accidents.
9. No Federal or State requirements currently exist for railroad yards to develop, adopt, test, or maintain an emergency preparedness plan; however, such requirements exist for other fixed-site facilities which handle large quantities of hazardous materials.
10. Several emergency planning guidelines sponsored by the Federal government identify many facilities within the community which are worthy of special hazardous materials precautions; railroad yards are not among those facilities cited.
11. Several Federal agencies exercise regulatory and/or enforcement powers regarding various phases of hazardous materials manufacturing and transportation; however, a coordinated effort among these agencies to effect improved emergency response or planning does not exist.
12. The Federal Emergency Management Agency has identified the need for greater intra- and interagency efforts to improve the planning and response to hazardous materials emergencies, including those emanating from railroad yards.
13. Early notification of an accident occurring in a railroad yard and knowledge of the types of hazardous materials transported therein were the items most often cited by public officials as necessary to improve their planning and response capabilities to a railroad yard emergency involving hazardous materials.
14. An increased level of emergency preparedness is the most practical alternative available for lessening the potential impact on the community from a large-scale hazardous materials release from a railroad yard.
15. Some communities, in conjunction with the railroad yards, had initiated or completed site-specific railroad yard preemergency plans subsequent to the Safety Board's public hearings on this issue.
16. At least three major railroads now have a policy requiring emergency preparedness for handling releases of hazardous materials within their railroad yards; two of these established their policy after the Safety Board's hearing.

### RECOMMENDATIONS

As a result of its Safety Study on Railroad Yard Safety, the National Transportation Safety Board made the following recommendations:

--to all railroads which operate railroad yards:

In coordination with communities adjacent to your railroad yards, develop and implement emergency planning and response procedures for handling releases of hazardous materials. These procedures should address, at a minimum, initial notification procedures, response actions for the safe handling of releases of the various types of hazardous materials transported, identification of key contact personnel, conduct of emergency drills and exercises, and identification of the resources to be provided and the actions to be taken by the railroad and the community. (Class II, Priority Action) (R-85-53)

--to the Federal Railroad Administration:

Develop in cooperation with the railroad industry and the Federal Emergency Management Agency (FEMA), criteria for emergency planning and response guidelines for use by operators of railroad yards that handle bulk shipments of hazardous materials, and incorporate these criteria into applicable sections of 49 CFR. The criteria should address, at a minimum, emergency plan content, initial notification procedures, the conduct of emergency drills and exercises, and the coordination of planning and response activities with local public emergency response officials. (Class II, Priority Action) (R-85-54)

-to the Federal Emergency Management Agency:

Develop emergency planning and response guidelines for use by communities and operators of railroad yards that handle bulk shipments of hazardous materials and by communities adjacent to railroad yards, and incorporate these guidelines into pertinent FEMA-sponsored training programs and manuals. (Class II, Priority Action) (R-85-55)

Expedite the implementation of the recommendations pertaining to management initiatives and to hazardous materials training contained in the report on the agency's 1984 review of these topics. (Class II, Priority Action) (R-85-56)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JIM BURNETT  
Chairman

/s/ PATRICIA A. GOLDMAN  
Vice Chairman

/s/ G. H. PATRICK BURSLEY  
Member

April 30, 1985

**APPENDIX A**

**SELECTED SURVEY FINDINGS**

Responses to survey question 4.b. "What, in your opinion are the major risks presented by this yard to railroad personnel and the community from hazardous materials?"

**YARD A: NONE SPECIFIED**

**YARD B: CHLORINE CLOUD; DAMAGED TRAILER-ON-FLATCAR LOADS; SABOTAGE BY EMPLOYEES**

**YARD C: CHLORINE RELEASE**

**YARD D: NONE SPECIFIED**

**YARD E: ALCOHOL, ANHYDROUS AMMONIA, AND HYDROGEN PEROXIDE RELEASES**

**YARD F: ACID SPILLS**

**YARD G: 6 GASOLINE CARS/DAY**

**YARD H: MAJOR PUNCTURE OR RUPTURE OF HAZ MAT CAR; HAZ MAT CAR FIRE**

**Note: Yards are not listed in the order appearing elsewhere in this appendix.**

Responses to survey question 10, "From your experience, what is needed to improve the safety of railroad and community personnel from a hazardous materials release which might occur from this yard?"

**YARD A: CAN'T THINK OF ANY.**

**YARD B: WE TRY TO STRESS SAFE HANDLING OF RAIL CARS TO PREVENT AN ACCIDENT—NOT SO MUCH EFFORT IS PUT ON HANDLING AN EMERGENCY.**

**YARD C: IMPROVED COMPLIANCE BY SHIPPERS FOR MEETING DOT REQUIREMENTS.**

**YARD D: KEEP TALKING AND MEETING WITH EMERGENCY RESPONSE GROUPS.**

**YARD E: HELICOPTER WITH NEUTRALIZING AGENTS FOR VARIOUS CHEMICALS. CONTROLS FOR THE RELEASE OF POISON GASES.**

**APPENDIX A**

**-34-**

**YARD F: AT LEAST AN ANNUAL REVIEW OF YARD EMERGENCY PLANS AND PROCEDURES.**

**YARD G: PROTECTIVE EQUIPMENT FOR FIREFIGHTERS.**

**YARD H: ONE RAILROAD PERSON IN CHARGE DURING AN EMERGENCY. IMPROVED FIRE DEPARTMENT TRAINING ON WAYBILL AND CONSIST INFORMATION.**

**Note: Yards are not listed in the order appearing elsewhere in this appendix.**

**Responses to survey question No. 5, "In your view, where does the railroad yard rank among other hazardous materials risks within your jurisdiction?"**

**CITY A: No. 1**

**CITY B: No. 1**

**CITY C: No. 2; MORE WORRIED ABOUT HIGHWAY ACCIDENTS**

**CITY D: REALLY NOT THAT MUCH OF A RISK**

**CITY E: No. 2 BEHIND A LARGE CHEMICAL PLANT**

**CITY F: No. 1 FOR IMPACT; HIGHWAY No. 1 FOR FREQUENCY**

**CITY G: No. 2 BEHIND LARGE PORT FACILITIES**

**CITY H: No. 1; TANK FARMS (FUEL) No. 2**

**Note: Cities are not listed in the order appearing elsewhere in this appendix.**

APPENDIX B

PUBLIC SECTOR EMERGENCY  
PREPAREDNESS SURVEY GUIDE

NOTE: In the public sector interview, we are trying to ascertain the level of preplanning by public sector groups and cooperation for haz mat risk management between the RR yard and the local emergency response network--particularly the fire and police departments.

Pay particular attention to the public officials':

- a. awareness of the risks presented by the yards  
haz mat movements;
- b. familiarity with the yard lay-out, RR emergency  
procedures, resources, etc.;
- c. notification procedure used by RR to contact  
public groups--especially for timeliness, infor-  
mation on the haz mat(s), and support once the  
public groups arrive.

NOTE: We are not trying to critique the City's entire emergency response network--only those tasks which are essential to risk management of yard hazards.

RESPONDENT DATA

CITY: \_\_\_\_\_ DATE: \_\_\_\_\_

Respondent's name\*: \_\_\_\_\_ TITLE: \_\_\_\_\_

Organization/address: \_\_\_\_\_

Telephone s: \_\_\_\_\_

\* If group interview, get all names and titles

PUBLIC SECTOR DATA SHEET

Name and address of Chief (if not the respondent):

# of full-time employees (by shift):

# of full-time employees especially trained or designated as hazardous materials specialists (by shift):

Location of nearest fire (or police) station to rail yard:

Special equipment or training related to yard haz mats at this station? If so, describe:

Annual departmental operating budget: \$

% of above dedicated to haz mat equipment/training: 1/

1/ PROBE: Have resources expended for haz mat incidents changed over the last 10 years? If so, increase or decrease? Why?

PUBLIC SECTOR QUESTIONNAIRE

NOTE: These questions refer to mitigation or accident prevention efforts.

- 1.) Has the city or county enacted any ordinances or codes which relate specifically to rail yard hazardous materials issues?

PROBE: extraordinary requirements or firefighting equipment, call boxes, water supplies, public warning devices, etc.?

- 2.) If not, have these ever been discussed at city council or county legislature forums?

PROBE: who initiated the proposals, why, what were pros and cons of stiffer requirements for yard safety activities?

- 3.) How often, if at all, is the yard inspected for compliance with fire code requirements?

PROBE: what are inspection criteria? Most importantly, are # or depth of inspections different for the yard than for other haz mat facilities in the jurisdiction? In other words, does the city perceive the yard to pose an extraordinary risk to the community?

APPENDIX B

-38-

- 4.) Has the city performed any kind of vulnerability analysis to determine what risks are posed to the community from the yard's haz mat movement?

PROBE: How is the analysis performed? Pay special attention to any efforts to identify and mitigate risks to special population densities (i.e., hospitals, nursing homes, schools, airports, etc.) and at various social times (i.e., rush-hour, business hours, off-hours, etc.

- 5.) In your view, where does the rail yard rank among other hazardous materials risks within your jurisdiction?

PROBE: Greatest risk? Higher than others? Compared to what? Especially, why is the yard a greater or lesser risk?

5.b.) In your view, does the degree of preparedness for a rail yard haz mat release match the ranking you have attached to it in the previous question?

6.) Are there any other special precautions this area has developed to decrease the risks posed by a haz mat release from the rail yard?

PROBE: Suggestions made but dropped for economic, legal, or political reasons. Try to draw from respondent his/her "ideal" solution to risk reduction.

## APPENDIX B

-40-

NOTE: These questions refer to emergency preparedness efforts. Determine if or to what extent these tasks are covered... Who covers them and how are for the next set of questions.

Does the city or county have a written emergency plan or SOP to prescribe activities in the event of a haz mat release or threat from the rail yard?

### GET COPIES

PROBE: The public sector's responsibilities/resources for:

- General emergency tasks;
  - preparedness plans specific to yard lay-out and resources
  - emergency exercises, training conducted jointly with yard personnel
  - warning systems to near-by exposures
  - emergency commo systems compatible with yard commo networks
  - evacuation plans, especially for special population densities
  - resource inventories
  - emergency personnel contact lists
  - mutual-aid agreements, especially with other chemical facilities
  - public information procedure, with planned input from yard officials
- Haz mat emergency tasks;
  - stockpile of neutralizing materials
  - special apparatus for haz mat emergencies
  - traffic control for general public and emergency response personnel.
  - protection of evacuated areas
  - command post designated on or near RR yard
  - notification procedure with RR indicating container condition, chemical I.D., and location within yard
  - means to determine plume path, concentration levels of plume

NOTE: This question refers to emergency response efforts.

8.) In the event of a haz mat release, how would public agencies perform the following tasks, if at all:

- General emergency tasks;
- activate public warning
  - notify required outside expertise
  - coordinate mobilization and placement of security forces with RR security personnel
  - provide search and rescue on RR property
  - initiate traffic control for general public and arriving emergency groups
- Haz mat emergency tasks;
- provide emergency medical assistance for haz mat treatment
  - man emergency operations center with chemical expertise
  - identify materials
  - notify other government officials
  - containment measures
  - track and or monitor plume
  - provide haz mat information/expertise

## APPENDIX B

-42-

NOTE: These questions refer to lessons learned from past haz mat experience.

9.) What has been your most recent or significant large-scale haz mat incident at this yard?

PROBE: Dates, container types, chemicals, deaths, injuries, damage costs, # evacuated, etc. DO NOT ASSUME that if NTSB investigated this accident, we'll have this data readily available.

10.) Did your emergency mitigation, preparedness, or response efforts change as a result of this experience?

PROBE: Changes in comms, site security, on-site equipment, training, drills, haz mat references, command and control, etc.

11.) From your experience, what is needed to improve the safety of the community from a haz mat release which might occur from the rail yard?

12.) Which of these measures are appropriate as RR efforts, which do you consider as government responsibilities?

PROBE: Who should take the lead in reducing the risks from rail yard incidents? WH/ HAS TAKEN THE LEAD?

COMMENTS, OBSERVATIONS, IMPRESSIONS, OTHER CONTACTS

## APPENDIX C

### RAILROAD YARD EMERGENCY PREPAREDNESS SURVEY GUIDE

#### RAIL YARD EMERGENCY SURVEY GUIDE

NOTE: We are trying to ascertain not only if the carrier has a plan to deal with emergencies, but more importantly, if a level of preparedness exists between the yard and public emergency groups to effectively carry out the tasks in this survey.

Pay particular attention to the types of contacts between carrier and public officials related to emergency response planning, drills, information exchange, etc. Probe respondents on lessons learned from past haz mat release experiences.

Obtain written supportive material whenever possible that supports the level of yard preparedness. REMEMBER, if it's not available at the yard, it's no good in an emergency!!! Do not discontinue extensive questioning because a document will be sent at a later date from corporate headquarters.

#### RESPONDENT DATA

City: \_\_\_\_\_ Date: \_\_\_\_\_

Respondent's name: \_\_\_\_\_ Title: \_\_\_\_\_

Company and address: \_\_\_\_\_

Telephone #: \_\_\_\_\_

RAIL YARD DATA SHEET<sup>1/</sup>

Name/address of yard:

Carrier:

# full-time employees (by shift); # supervisors (by shift):

# full-time security and/or fire-rescue employees (by shift):

Annual # of rail cars moved through yard (10 year trend):

1973	1978
1974	1979
1975	1980
1976	1981
1977	1982
	1983

PROBE: Differences among shifts for staff levels and car movements

Data on haz mats moved, if available in any form; #, quantities, chemicals

Annual yard operating budget: \$

% of above dedicated to emergency resources:

Type of yard switching operation (hump, roll-to-rest, etc.)

<sup>1/</sup> Get a good map showing yard lay-out and proximity to populated areas, hospitals, schools, plants, airports, etc.

APPENDIX C

-46-

RAIL YARD QUESTIONNAIRE

NOTE: These questions refer to mitigation or accident prevention efforts.

1.) Does the company publish any safety codes or guidelines on the safe handling of haz mat cars specifically for this yard? (get copies or describe in detail)

2.) How are yard employees made aware of these procedures initially and on a refresher basis? (signs, posters, training sessions, bulletins, etc.)

PROBE: get as much info on training as possible.

3.) Is this yard inspected (regularly or sporadically) to ascertain specified levels of haz mat handling procedures?

PROBE: by whom? (RR personnel, FRA, city fire inspectors, insurance company, etc.)

- 4.) Has anything like a vulnerability analysis been performed for this yard to assess the quantity and types of haz mat's going through it?

PROBE: Who does it, how often, how is it used, who gets it?

- 4.b.) What, in your opinion, are the major risks presented by this yard to RR personnel and the community from hazardous materials?

- 5.) Describe any special precautions or procedures this yard has established to reduce the possibility of a haz mat release during switching operations. (special commo equipment, special procedures for specific car types or products, etc.)

## APPENDIX C

-48-

NOTE: These questions refer to emergency preparedness efforts. Determine if or to what extent these tasks are covered... Who covers them and how are for the next set of questions.

6.) Does the yard have a written emergency plan or SOP to prescribe activities in the event of a haz mat release or threat?

### GET COPIES

PROBE: The rail yard's responsibilities/resources for:

General emergency tasks;  
preparedness plans  
emergency exercises, training  
warning systems to RR personnel and close-by exposures  
emergency commo systems  
evacuation plans and training  
resource inventories  
emergency personnel contact lists  
mutual-aid agreements  
public information  
Haz mat emergency tasks;  
containment equipment  
stockpile of neutralizing materials  
emergency training for non-haz mat personnel  
special apparatus for emergencies  
traffic control--rail and vehicle  
protection of evacuated areas (RR property)  
command post for arriving emergency personnel

NOTE: This question refers to emergency response efforts.

7.) In the event of a haz mat release, how would RR personnel perform the following tasks, if at all:

- General emergency tasks;  
activate public warning  
notify public authorities  
mobilize emergency RR personnel/equipment  
provide emergency medical assistance  
man emergency operations center  
evacuate RR personnel  
mobilize and place RR security forces  
provide search and rescue  
initiate traffic control (rail and vehicle)
- Haz mat emergency tasks;  
identify materials  
notify company and government officials  
(PROBE order of calls and nature of information)  
containment measures  
track and/or monitor plume  
provide haz mat information/expertise

APPENDIX C

-50-

NOTE: These questions refer to lessons learned from past haz mat experience.

8.) What has been your most recent or significant large-scale haz mat incident at this yard?

PROBE: Dates, container types, chemicals, deaths, injuries, damage costs, # evacuated, etc. DO NOT ASSUME that if NTSB investigated this accident, we'll have this data readily available.

9.) Did your emergency mitigation, preparedness, or response efforts change as a result of this experience?

PROBE: Changes in comms, site security, on-site equipment, training, drills, haz mat references, command and control, etc.

10.) From your experience, what is needed to improve the safety of railroad and community personnel from a hazardous materials release which might occur from this yard?

10.a.) Which of these measures are appropriate as RR efforts and which do you consider as government responsibilities?

PROBE: Who should take the lead in reducing the risks from rail yard haz mat incidents? WHO HAS TAKEN THE LEAD?

COMMENTS, OBSERVATIONS, IMPRESSIONS, OTHER CONTACTS

APPENDIX D

CARS SWITCHED AT SOMERVILLE -- 1982

CARS SWITCHED AT SOMERVILLE

1982

FLAMMABLE GAS

Liquefied petroleum gas  
Methyl chloride

3  
1

NON-FLAMMABLE GAS

Carbon dioxide  
Anhydrous ammonia

129  
21

FLAMMABLE SOLID

Calcium carbide  
Wastepaper, ground

19  
1

FLAMMABLE LIQUID

Naphtha, petroleum  
Hexane  
Methyl methacrylate monomer  
Chlorobenzene  
Spirits, grain  
Alcohol in bond  
Compounds, paint thinning  
Alcohol, N.O.S.  
Brandy, alcoholic

10  
6  
1  
1  
1  
4  
2  
1  
1  
1

OXIDIZER

Sodium nitrate

4

CORROSIVE MATERIAL

Acid, H.E.C., dry  
Sulphuric acid  
Hydrochloric (Muriatic) acid  
Phosphorus trichloride  
Cleaning compound  
Corrosive liquid, N.O.S.  
Compounds, water treatment

19  
89  
33  
83  
3  
1  
1

POISON B

Sodium arsenite .

1

FLAMMABLE OR COMBUSTIBLE LIQUID

Wine, sparkling  
Liquors, alcoholic  
Wines, N.E.C.  
Plasticizers, paint, lacquer or varnish

3  
1  
91  
122

CARS SWITCHED AT SOMERVILLE

(Cont.)

1982

COMBUSTIBLE LIQUID

Alcohol, N.E.C.  
Alcohol, N.O.S.  
Hexyl alcohol  
Decyl alcohol  
Fuel oil

14  
3  
37  
9  
4

OTHER REGULATED MATERIALS

Naphthalene (ORM-A)  
Maleic acid (ORM-A)  
Adipic acid (ORM-E)

6  
13  
135

TOTAL 873

## APPENDIX D

-54-

CARS THROUGH SOMERVILLE1962

<u>FLAMMABLE GAS</u>	
Liquefied petroleum gas.	184
<u>FLAMMABLE LIQUID</u>	
Alcohol, denatured	5
Methyl ethyl fl.	1
Alcohol, N.O.S.	1
Chemicals, N.E.C.	2
Ethyl alcohol anhydrous	1
<u>FLAMMABLE SOLID</u>	
Tankage, crude	17
Sodium metallic	13
Blood flour	23
Rags	0
Grain, spent	2
Rubber scrap	1
<u>OXIDIZER</u>	
Compounds, fertilizing	5
Sodium nitrate	1
<u>CORROSIVE MATERIAL</u>	
Hydrochloric (Muriatic) acid	339
Potassium hydroxide	4
Sodium hydroxide	39
Acid, N.E.C., liquid	1
Fertilizer solution, water, free ammonia and sulphur	1
Chemicals, N.E.C.	1
<u>FLAMMABLE OR COMBUSTIBLE LIQUID</u>	
Compounds, paint thinning	6
Mines, N.E.C.	24
<u>COMBUSTIBLE LIQUID</u>	
Fuel oil	337
Oil, N.O.S.	1
Chemicals, N.E.C.	1
Petroleum oil, N.E.C.	4
Glycol ethers	1
Petroleum lube oil	2
Fuel oil distillate	46
<u>OTHER REGULATED MATERIALS</u>	
Sodium salts (ORM-A)	31
Aluminum sulphate (ORM-B)	104
Adipic acid (ORM-E)	2

TOTAL 1247

APPENDIX E

SOUTHERN RAILWAY SYSTEM RAIL YARD EMERGENCY  
PLAN: SELECTED EXCERPTS

(6)

Section I

Guide 1C - Data Below To Be Furnished to Atlanta Fire Department

CHECK-LIST FOR INCIDENTS IN RAILROAD YARDS

EXACT LOCATION:

TYPE FIRE: (Tank car, Boxcar, Structures, Trash,  
Grass, Liquid Spill)

TYPE HAZARDOUS MATERIAL: (Correct spelling if  
possible)

WIND DIRECTION IF HAZARDOUS MATERIAL: (Then nearest  
gate on leeward side)

NEAREST WATER SUPPLY: (If possible)

(17)

Section VI

SOUTHERN RAILWAY SYSTEMRECOMMENDATIONS FOR HANDLING INCIDENTS INVOLVING HAZARDOUS MATERIALS

Upon receipt of a report of an emergency, fire, accident or other occurrence involving property or equipment of Southern Railway, it is recommended that the Fire Chief or other responsible authority take the following course of action:

1. Determine from person reporting the incident:
  - (a) WHAT (what is involved, including commodities, number of cars and their condition; whether on fire, leaking, etc.)
  - (b) WHERE (specific location and best avenues of approach)
  - (c) WHEN (when did incident occur, when access will be permitted and whether evacuation is necessary or has been effected.)
2. Based on information received, decide if the situation is of a disaster potential and beyond the capability of your organization. If so, request assistance of mutual aid support units, as appropriate.
3. At the scene establish contact with the senior railroad officer or representative before attempting to deal with the emergency; information as to which materials are involved can be determined from the train waybills. Extreme caution should be exercised, particularly when this information is not available and the commodities involved cannot be identified.
4. Determine by ground reconnaissance the most effective action to take, requesting assistance from other units as required.
5. If there is undue risk to life, retreat to a safe distance and remain until such time as it is, in your opinion, safe to re-enter the area and take appropriate action.

SOUTHERN RAILWAY SYSTEM  
RECOMMENDATIONS FOR HANDLING FIRES INVOLVING HAZARDOUS MATERIALS

Upon receipt of a report of an accident or other occurrence involving equipment of Southern Railway, it is recommended that the Fire Chief or other responsible authority take the following course of action:

1. Contact by telephone or other appropriate means the responsible railroad dispatcher. He can be reached at the following telephone:

\_\_\_\_\_  
Alternate means of communication are:

- a. Railroad telephone through local railroad representative.
  - b. Train radio through train engineer or conductor.
2. Secure from the dispatcher the following information:
    - WHAT (which commodities are involved in accident or fire and number of cars)
    - WHERE (specific location and best avenues of approach)
    - WHEN (accident occurred - when access to same will be permitted - whether or not evacuation of area has been effected).
  3. Based on information received from the railroad dispatcher, decide if the situation is of a disaster potential and beyond the capability of your organization. If so, request assistance of mutual aid support units, police, civil defense or military units as appropriate.
  4. At the scene establish contact with the senior railroad officer or representative before attempting to deal with the emergency; information as to which materials are involved

- 2 -

can be determined from the train waybills. Extreme caution should be exercised, particularly when this information is not available and the commodities involved cannot be identified.

5. Determine by ground reconnaissance the most effective action to take, requesting assistance from other units as required.
6. If there is undue risk to life, retreat to a safe distance and remain until such time as it is, in your opinion, safe to re-enter the area and take appropriate action.

(6)

Section 1

Guide 1C - Data Below To Be Furnished to Atlanta Fire Department

CHECK LIST FOR INCIDENTS IN RAILROAD YARDS

EXACT LOCATION:

TYPE FIRE: (Tank car, Boxcar, Structures, Trash,  
Grass, Liquid Spill)

TYPE HAZARDOUS MATERIAL: (Correct spelling if  
possible)

WIND DIRECTION IF HAZARDOUS MATERIAL: (Then nearest  
gate on leeward side)

NEAREST WATER SUPPLY: (If possible)

END  
DATE  
FILMED  
10-29-85  
NTIS